154
v.1
#1

Tipularia

A BOTANICAL MAGAZINE

Published by the Georgia Botanical Society Spring 1989

LIBRARY
JUL 31 1989
NEW YORK
BOTANICAL GAR

IN THIS ISSUE

More on Outcrops/2
A *Self-taught Botanist*/9
Driving the Bartram Trail?/13
Natives for Your Garden/19

First Person Singular

Botany Is Where You Find It

By Helen Stacey

IN THE mountains, in the river bottoms, in the hollows and the hills...on the corner of Clifton and Briarcliff and in the Atlanta Civic Center parking lot, botany is where you find it.

Settle the briefcase in, buckle the seat belt, shift into gear and head off to work. Under the transmission lines on the left is a drift of Queen Anne's Lace (*Daucus carota*) accented by a fine clump of rich orange butterfly weed (*Asclepias tuberosa*). I admired it during the morning traffic jam, coveted it during the afternoon slow-down. Finally I bought some from a nursery after resisting the impulse to throw spade in the car with the briefcase.

Queen Anne's Lace, golden ragwort (*Senecio smallii*) and "common" daisies (*Chrysanthemum leucanthemum*) make a nice cottage garden amidst the raw earth and junk that will eventually turn into more shopping malls or apartments. Something purple here adding a nice zip of color, but in the traffic hour, there's no time to look. I'll have to check it out on another commute.

The geriatric center on Clifton near Briarcliff Road may have disturbed the birds a bit when it was built so near the wet bottom land there, but it didn't bother the wild (or alien-turned-into-native) roses. Their white multi-flowered blooms grace the branches of most of the trees in this area. Another assimilated foreigner abides here too. The scent of the honeysuckle is on the air. "Wad some gift the giftee gie" me to live life with the vigor and energy of *Lonicera japonica!*

Through residential neighborhoods, neat with their hybrids, and past commercial areas beginning to face the day, I then cut through to Ralph McGill Boulevard by Great Park land. Showy evening primrose (*Oenothera speciosa* Nutt.) grows here in abundance between the road and the curb. Daisies again make sweeps through the grass. A dot of yellow ragwort appears now and again and some lovely clumps of red clover (*Trifolium pratense*). What an elegant flower is red clover! Were it rarer and harder to grow, we'd all treasure it!

Journey's end. The Civic Center parking lot is just ahead. Meager pickings botanical-

(Continued on page 25)

Fielding Your Questions

A new Tipularia service debuts with this issue: Its purpose is to answer any questions our readers might have regarding botanical whys and wherefores. Obviously we cannot do plant identifications in a column, nor are we a horticultural organization, but we would like questions of general interest on botany or botanical processes which can be answered briefly. Please send your questions to the Executive Editor.

Question: Who may use the University of Georgia Herbarium? Is there a charge?

Answer: According to Nancy C. Coile, Curator of the Herbarium, "We welcome the visits of private citizens who are curious about plants." The Herbarium's Policy states that the "staff will provide routine identification and information services for private citizens of Georgia" at no charge, provided the request does not require excessive staff time. Private firms, agencies, and grant-holding projects are charged a fee of $15/hour if the Herbarium staff is needed for research services but are charged only $5/hour if the firm's own staff does the work.

To facilitate matters, all visitors are encouraged to let Nancy know before they come. Normal Herbarium hours are Monday-Friday from 8:00 AM to 5:00 PM, with an hour off at lunch time. A complete copy of the "Policy for Use of Herbarium Collections and Facilities" can be had by contacting Nancy at the Department of Botany, University of Georgia, Athens, Georgia 30602.

Vol. 4, No. 1 **Tipularia** **Spring 1989**

Introducing a New Department: Fielding Your Questions *(Opposite Page)*
2 **True Grit: Georgia's Other Outcrops** *By Vicky Holifield*
Sandstone and granite abounding in our state have their own floral offerings *(Illustrated by the author)*
9 **A Young-at-Heart Botanist** *By Louise M. Morgan*
Frieda Polsfuss: Four-Score-Years-and-Eleven
13 **Through the Eyes of William Bartram** *By Marie B. Mellinger*
His Studies and Discoveries in Northeast Georgia
15 **The Ballad of Billy Bartram** *(Illustration by Bill Close)*
19 **Assimilating the Natives** *By Samuel B. Jones, Jr.*
Some Southeastern Native Plants for Landscape Use

Inside Front Cover **First Person Singular** *Helen C. Stacey*
18 **Book Report** *Marie B. Mellinger*
18 **First Person Singular** *A. M. Oshlag, M.D. (Illustrated by Margery Borom)*
23 **Book Report** *L. Scott Ranger*
24 **Site-Seeing** Urban River Riches *Jerry Hightower*
Back Cover **Byliners**
Addenda

Front Cover In late summer, the green-fly orchid *(Epidendrum conopseum)* blooms on the mossy rock overhangs at Broxton Rocks. Its fragrant yellow-green flowers tinged with purple lend an exotic air to the shady gorge. *Illustration by Vicky Holifield*

Board of Editors Vernon Bates, Treadwell Rice Crown III, David L. Emory, Wayne R. Faircloth, Marie B. Mellinger, Tom Patrick, Harriett L. Whipple.

Executive Editor Anna Belle Close

Business Manager Sally Emory

Staff Betty Devon, Charles Devon, Ruby Gill, Robert H. Gill, Eleanor Lehner, Frank Lehner, Gail Russell, Helen C. Stacey

Consultants Madeline P. Burbanck, Carlton and Rebecca Nunan

Production Bill Close, production artist and camera work; Graphics, Etc., typesetting; Gwinnett Printing Co., Inc., printer.

Tipularia is published at intervals by the Georgia Botanical Society to foster knowledge of and interest in the state's native plants and related subjects. Membership in the Society is open to all persons interested in the botany of Georgia. Annual dues: individual or family, $15; group, $20; student, $5. Other membership categories: contributing, $25; donor, $100; patron, $1,000. Send mailing address and check made payable to the Georgia Botanical Society to: Suzanne S. Jackson, 3461 Ashwood Lane, Chamblee, Georgia 30341.

Members of the Society receive *Tipularia* without extra charge. Others may receive the magazine by becoming *Tipularia* associates for $7 a year. To become an associate, send mailing address and check made payable to the Georgia Botanical Society to: Sally Emory, Business Manager, *Tipularia,* 7575 Rico Road, Palmetto, Georgia 30268. With the exception of Vol. 1, No. 1, single copies are available in limited quantities from the same address for $4 each.

Editorial information: The Georgia Botanical Society's goal for *Tipularia* is to combine the scientific authority of a botanical journal with the readability of a magazine. Some articles are assigned, but other manuscripts are welcome. *Tipularia* is not able to pay for articles (or illustrations), but there is no charge for publication. Send all manuscripts and editorial inquiries to: Anna Belle Close, Executive Editor, *Tipularia,* 225 Forkner Drive, Decatur, Georgia 30030. A copy of our "Guidelines for Authors" is available from the same address on request.

Copyright 1989 by the Georgia Botanical Society. Postage paid at Decatur, Georgia. Send address changes to: Sally Emory, Business Manager, *Tipularia,* 7575 Rico Road, Palmetto, Georgia 30268.

True Grit: Georgia's Other Outcrops

Sandstone and granite abounding in our state have their own floral offerings

By Vicky Holifield

MORE THAN A FEW Georgians have made special trips in the spring or fall to see the spectacular wildflower displays on Stone Mountain, Heggie's Rock, or other granite outcrops scattered across the southern Piedmont. Not only tourists but also a small host of scientists have found themselves attracted by either the landscape or the rich botanical history of the granites. Few botanists, however, have explored the wonders of Georgia's other outcrops: the sandstone formations south of the Fall Line on the Altamaha Grit. They might lack the grandeur of the granites, but these neglected outcrops support a remarkably diverse flora, contain a surprising array of rare plants and offer their own distinctive forms of scenic beauty.

Early in this century, the unusual variety of plants on the sandstone outcrops caught the eye of the prolific writer and naturalist Roland Harper. He first noticed them while travelling by train through southeastern Georgia, and when he took a closer look—often walking miles from isolated train stations like Reidsville and Peacock Crossing—he found that the flora of the sandstones seemed strikingly similar to that of the granite outcrops above the Fall Line. Between 1900 and 1904, he visited every

county in the Altamaha Grit Region of the Coastal Plain of Georgia.

In discussing the habitat groups of the Grit, Harper observed that several species on the outcrops appeared nowhere else in the Coastal Plain. Convinced that these outcrops offered a rare opportunity to study the relationship between botany and geography—the subject of the science of phytogeography—he returned to the sandstone sites, recording his research in numerous articles. Other projects soon diverted his attention, and for several decades the sandstones failed to attract much serious study.

Travelling through Georgia in the late 1930's, however, botanists Rogers McVaugh and J. H. Pyron explored some of the Altamaha Grit outcrops in order to collect botanical specimens. By 1943 McVaugh was ready to publish a new monograph on the granitic flat rocks; like Harper, he found it noteworthy that several plants generally confined to the granite outcrops also occur on the sandstones. Scientists continued after 1943 to investigate the granite flora, but no one seemed to share Harper's interest in the plant life of the sandstones. By the 1970's, though, a few investigators began once again to take the sandstone outcrops seriously. Charles Wharton briefly examined them in his work on the natural environments of Georgia, and, in reports on the rare plants of the South, Robert Kral noted the affinity of the Altamaha Grit outcrop flora to that of the granitic glades. In 1987, Bill Murdy and Eloise Carter of Emory University suggested the need for another look at the flora of the Altamaha Grit outcrops and the literature about it. My research grew out of their suggestion.

For over a year I made periodic trips into the Altamaha Grit, which is located in the heart of Georgia's Coastal Plain. (The Coastal Plain is the area of the state lying below the Fall Line, an indefinite boundary named for the falls or rapids that form in rivers at the points where they flow from the harder Piedmont rocks to the less resistant rocks in the southern half of the state.) A region marked by valleys cut by the Altamaha, Ocmulgee, and Oconee Rivers, the Altamaha Grit covers about three-fifths of the Coastal Plain and includes most of the wiregrass region. My research trips took me throughout the Grit, from its northern limit, in Jefferson County, to the Flint River in the west and Coffee County in the south.

Harper thought the outcrops among the pine barrens of the Altamaha Grit were unmatched elsewhere in the Southeast. Paul Huddlestun of the Georgia Geologic Survey has confirmed Harper's observation: "Lithologically," Huddlestun has written, "the Altamaha

Formation is unique among formations in the southeastern Coastal Plain." It consists of hardened clays and sands occurring just below a layer of Lafayette loam. It contains no fossils; its deposits are of terrestrial rather than marine origin, having been formed as a flood plain and delta during the early to middle Miocene age. It has few exposed outcrops, but some jutting beds of gray sandstone (often mottled with iron ox-

ide) form barren rocky flats. Harper identified such outcrops in at least 16 counties; he estimated that their total area would not exceed one square mile. But the 1976 Geological Survey Map shows around 200 outcrops in the region, so Harper's estimate probably falls far short. The only Altamaha Grit outcrop outside of Georgia is in Washington County, Florida, near Chipley.

One can best appreciate the flora of the sandstones by comparing it with that of the harder and older granite outcrops of the Piedmont. The latter provide several zones for vegetation: bare rock where lichen and mosses establish colonies; depressions or weather pits, some periodically containing water and others accumulating varying depths of soil; deeper soil islands; and margins of soil bordering the outcrops. Among the pioneer plants on the bare rock are *Cladonia* species, *Grimmia* species, *Polytrichum commune,* and (on eastern outcrops) *Selaginella* species. *Amphianthus pusillus* and *Isoetes* species grow in the rimmed pools while the Diamorpha community occupies the shallow soil of other depressions. Confederate daisy *(Viguiera porteri),* sandwort *(Minuartia uniflora),* rushfoil *(Crotonopsis elliptica),* wooly ragwort *(Senecio tomentosus),* sunnybells *(Schoenolirion croceum),* and fame flower *(Talinum teretifolium),* as well as small shrubs and trees, inhabit the margins and soil islands. Such plants, including many specially adapted endemics, thrive despite the seemingly hostile environment, which offers only shallow soil and little protection from extremes of temperature. (See David L. Emory, *Tipularia, November 1987, pp. 20-23.)*

The Altamaha Grit sandstones lack the rimmed pools and well-defined depressions found on the granite exposures. They appear in the form of flat rock areas, usually on the slopes in dry pine barrens, or occasionally as small cliffs or bluffs. (The rock is easily recognized by its gray and dark brown pitted surface.) The soil accumulates in irregular patches in cracks, crevices and weathered depressions on the flat surface. Such an environment cannot support the floristic diversity that marks the granites.

Yet the sandstones provide a home for an impressive variety of plants, many of which are not characteristic of the Coastal Plain flora. In shallow beds scattered over the rock, one can find the typical Altamaha Grit plants: spikemoss *(Selaginella* species), Nuttall's golden weed *(Bigelowia nuttallii),* fame flower *(Talinum teretifolium),* sandwort *(Minuartia uniflora),* rushfoil *(Crotonopsis elliptica),* candywort *(Polygala curtissii),* pineweed *(Hypericum gentianoides),* and wooly ragwort *(Senecio tomentosus).* On the margin of shallow soil bounding the rock, a few plants can flourish in isolation from competitors that require deeper soil. Here one finds blue-star *(Amsonia ciliata),* sandhill lily *(Nolina georgiana),* southern Barbara's buttons *(Marshallia ramosa),* Walter's aster *(Aster walteri),* feather-leaf penstemon *(Penstemon dissectus),* and a number of shrubs and trees. Several plants common in the surrounding pine barrens have gained a foothold on the rock: longleaf pine *(Pinus palustris),* wiregrass *(Aristida stricta),* wild buckwheat *(Eriogonum tomentosum),* dwarf post oak *(Quercus margaretta),* dwarf huckleberry *(Gaylussacia dumosa),* winged sumac *(Rhus copallina)* and gallberry *(Ilex glabra).* Small bogs sometimes form in seepage areas that retain moisture on the rock surface, providing a damp environment for false pimpernel *(Lindernia monticola),* sunbonnets *(Chaptalia tomentosa),* yellow-eyed grass *(Xyris* species), sundew *(Drosera* species) and pitcher plant *(Sarracenia* species).

To visit various sandstone outcrops is to become especially aware of the diversity of their plant life. On the flat rocks near Sandersville in Washington County, which are closest to the Fall Line and to the granite outcrops, the affinity of the two habitats is clear: *Diamorpha smallii,*

When Roland Harper visited the Washington County outcrops, he discovered a new type of dodder, now called *Cuscuta harperi.* This parasitic plant was growing on *Bigelowia nuttallii.*

Talinum teretifolium, Liatris microcephala, and *Allium cuthbertii,* all typical granite species, grow alongside *Bigelowia nuttallii, Marshallia ramosa, Nolina georgiana,* and *Aster walteri.* Most other sandstone outcrops look much the same as the Sandersville site—pitted rock, shallow soil beds and seepage areas—but no two are exactly alike. In fact, their floristic diversity is often what distinguishes them.

The flat rocks on and near the Mt. Bethel Campground in Turner County, for example, look similar to the Sandersville formations: pineweed, fame flower, rushfoil, candywort and

Delphinium carolinianum, a larkspur with narrowly dissected leaves, occurs on granites in the Heggie's Rock region, but it is equally at home on the sandstone at Broxton Rocks.

Nuttall's golden weed grow in the thin sandy soil. On this site two other showy species join the typical outcrop flora: a St. John's-wort *(Hypericum reductum)* and *Penstemon dissectus.* In the spring, the penstemon blooms abundantly in patches around the rocky areas and the outcrop margins, competing successfully with the wiregrass and occasionally spreading into the surrounding pinelands. In summer, yellow clumps of the St. John's-wort dominate the rocky landscape.

One finds the widest floristic variety, however, at a site near Broxton in Coffee County. Rocky Creek has there interrupted the flatrock formations by breaking through the rock, forming a small waterfall and cutting steep walled ravines through the sandstone. The xeric canyon rims support populations of *Delphinium carolinianum* as well as *Penstemon dissectus* and other typical outcrop plants, but the shaded canyon walls and moist crevices provide a home for mosses, liverworts and ferns. The rare green-fly orchid, *Epidendrum conopseum,* which usually grows on the smooth bark of trees, clings to the vertical walls of the gorge. (See the Cover.) Harper was suprised to find hairy lipfern *(Cheilanthes lanosa)* flourishing here over 100 miles away from the nearest granite outcrop.

The species list I am compiling of the Altamaha Grit outcrops now includes more than 150 vascular plants, trees, shrubs and vines; approximately 50 of these species also occur on the granite outcrops. Three species of special interest are almost always confined in Georgia to the rocky areas in the Grit: *Bigelowia nuttallii, Marshallia ramosa* and *Penstemon dissectus.*

The presence of *Bigelowia nuttallii,* also known as rayless goldenrod, provides a sure indication of an Altamaha Grit outcrop. Locating one of the smaller flat rock areas can be difficult; one soon learns to keep an eye out for the distinctive green of the *Bigelowia's* linear-leaved basal rosettes. The range

Bigelowia nuttallii is perhaps the most characteristic of the Altamaha Grit sandstone plants. In the fall, masses of its waxy yellow-green blossoms rival the displays of the Confederate daisies on the granites.

of this species extends from east Texas to Georgia on dry rocky sites. In Georgia, *Bigelowia nuttallii* occurs almost exclusively on Altamaha Grit outcrops, but its occurrence in Georgia presents a curious anomaly. For reasons no one has yet fully explained, a few isolated disjunct populations of this species are also thriving north of the Fall Line on granite outcrops in Rockdale and Walton Counties.

Marshallia ramosa, or southern Barbara's buttons, discovered in 1900 near Eastman, Georgia, by C. L. Boynton, is usually found rooted in full sun in soil pockets on or near the Altamaha Grit outcrops. It is rare, but it sometimes becomes abundant locally. The white to

In June the showy white heads of southern Barbara's buttons contrast sharply with the surrounding wiregrass.

Penstemon dissectus, with its hairy stems and deeply dissected leaves, is well-adapted to the hot dry environment on the outcrops.

pale lavender discoid flowers form showy flattened heads. *Marshallia ramosa* is local on the Altamaha Grit formation of Georgia, but populations occur near Rock Hill in Washington County, Florida, and on serpentine rock in Columbia County, Georgia, above the Fall Line.

Penstemon dissectus, sometimes called feather-leaf penstemon or dissected beard-tongue, is the closest to a true endemic on the Altamaha Grit outcrops. In May, the rocks and their margins are crowded with its violet blooms. Like the *Marshallia ramosa,* this beard-tongue is also included in the 1987 "Preliminary List of the Rare Plants Of Georgia," by Tom Patrick.

The sandstone outcrops are valuable not only for their botanical diversity but also because they provide a habitat for a surprising number of rare plants. Twelve species from the "Preliminary List of Rare Plants in Georgia" are found on the Grit outcrops. In 1970, Wayne Faircloth reported a colony of the rare *Elliottia racemosa* on a Grit outcrop in Turner County, and since then Frankie Snow has located *Elliottia* on the sandstones of Jeff Davis County. Recently Jim Allison and Tom Patrick have noted what appears to be *Portulaca teretifolia* var. *cubensis,* disjunct from the Caribbean, on the rocks in Jeff Davis County, and Frankie Snow has confirmed the presence of *Ophioglossum nudicaule* in Coffee County. Eloise Carter is investigating a group of *Talinum* which seems to be unique to the region. Further study of the outcrop flora will undoubtedly expand the species list and possibly lead even to the discovery of more rare plants.

Some of the species and habitats of the Altamaha Grit outcrops now face threats, which range from indiscriminate dumping and the use of all-terrain vehicles to the planting of slash pine. Their loss would represent a tragic diminution of Georgia's natural environment. Naturalists have therefore initiated efforts to save them. The Georgia Field Office of the Nature Conservancy, for example, is formulating plans for the purchase of the Broxton Rocks site in Coffee County as a nature preserve. Preservation will ensure that the unique habitats of the sandstone outcrops can continue to provide settings for a diverse array of plant life, assuring the opportunity for future botanists and other visitors to explore this distinctive natural environment.

Scientific nomenclature is according to John and Rosemarie Kartesz, "A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland." (1980) Univ. of N.C. Press, Chapel Hill.

LIST OF REFERENCES

Anderson, Loran. 1970. Studies on *Bigelowia. Sida* 3 (7): 451-465.

Cronquist, Arthur. 1980. *Vascular Flora of the Southeastern United States,* Vol. I, *Asteraceae.* Univ. of N.C. Press, Chapel Hill.

Duncan, Wilbur and Kartesz, John. 1981. *Vascular Flora of Georgia, an Annotated Checklist.* Univ. of Ga. Press, Athens.

Faircloth, Wayne. 1970. An occurrence of *Elliottia* in central South Georgia. *Castanea* 35 (1): 58-61.

Harper, Roland. 1904. The type locality of *Arenaria brevifolia.* Torreya 4: 138-141.

— 1906. A phytogeographical sketch of the Altamaha Grit region of the coastal plain of Georgia. *Annals of the New York Academy of Science.* 17: 1-357.

— 1906. Some hitherto undescribed outcrops of the Altamaha Grit and their vegetation. *Torreya.* 6: 241-246.

Huddlestun, Paul. 1988. A revision of the lithostratigraphic units of Georgia, the Miocene through the Holocene. *Georgia Geological Survey Bulletin.* 104.

Kartesz, John and Kartesz, Rosemarie. 1980. *A Synonymized Checklist of the Vascular Flora of the United States, Canada, and Greenland.* Univ. of N.C. Press, Chapel Hill.

Kral, Robert. 1983. A report on some rare, threatened or endangered forest-related vascular plants of the South, Vols. I, II. U.S. Department of Agriculture, Washington D.C.

McVaugh, Rogers. 1943. The vegetation of the granitic flat-rocks of the southeastern United States. *Ecological Monographs* 13 (2): 119-166.

Patrick, Tom. 1987. Preliminary list of the rare plants of Georgia. Georgia Natural Heritage Inventory Program, Social Circle, Georgia.

Radford, Albert E., Ahles, Harry E., and Bell, C. Ritchie. 1968. *Manual of the Vascular Flora of the Carolinas.* Univ. of N.C. Press, Chapel Hill.

Small, John. 1933. *Manual of the Southeastern Flora.* Univ. of N.C. Press, Chapel Hill.

Wharton, Charles. 1978. *The Natural Environments of Georgia.* Georgia Department of Natural Resources, Atlanta.

A Young-at-Heart Botanist

Frieda Polsfuss: Four-score-years-and-eleven

By Louise M. Morgan

FRIEDA POLSFUSS, self-taught botanist, poet, horticulturist, culinary expert, philosopher, mother, grandmother and friend, celebrated her 91st birthday in January 1989. She began that day as usual: She read the paper, worked on the crossword puzzle and then shared the paper with a neighbor, caught up on her correspondence (some in German to relatives), did a little on her latest cross-stitch piece (which she'll probably give away as she has the last dozen pieces), and prepared to enjoy the visitors who appear daily. When an early afternoon crowd arrived,she realized these friends were there to give her a surprise birthday party and to express their love and appreciation to her for the many ways she had touched their lives.

Ninety-one years filled with learning and sharing — that is what her friends will say. Acknowledged as the botanist most familiar with the Middle Georgia flora, Frieda is still learning and sharing. One does not leave her home without a new piece of information she shares from her readings or a gift of a plant or cutting, a completed cross-stitched picture, something to eat or read.

The first of five children born to a father who was a forester and a mother whose ancestry she can trace to the

1600's, Frieda Wulk was born in 1898 in Hanover, Germany. During her early years the family moved several times, and she grew up exploring and learning about the many different woods she lived in. She recalls an early love for "growing things."

Frieda began her formal education early and by 14 graduated from a two-room schoolhouse. At 16 she was sent to a school for young ladies to "learn to run a household." By this time her father wanted her to marry — the duty of every German girl — but her mother encouraged her to get more education. So she was sent off to Berlin for six years — three in a preparatory school and three in a teachers' college. These were war years, and she will always remember the lack of decent food.

The Berlin event destined to shape her life was meeting Eugene Polsfuss. "He had been a French prisoner of war," Frieda relates, "and was not released until 1920, two years after the war's end. His home was West Prussia, but West Prussia had fallen to Poland, so he had no homeland to return to, and the family farm, which they had farmed since Friederich the Great, was gone." Frieda's father had placed an ad for a farm manager which Eugene answered. Since she was in Berlin at the time, her father asked her to get in touch with him and decide if he would be a good employee. As it turned out, she not only approved but also liked him very much and suggested that he be hired. The attraction between the two was obvious to her parents, but they thought the match a mistake.

Frieda had by now returned home, but the deep economic depression in Germany meant no work for a young teacher. At her mother's suggestion she wrote her father's oldest brother, who had earlier settled in Wisconsin. He was so sure that she could find a teaching job that he sent her passage money. Secretly engaged to Eugene, who planned to follow her to the U.S., Frieda arrived in New York on Ellis Island in May 1923 and travelled by train to Wisconsin. However there were no teaching positions available in the German-Lutheran Church group, so her first job was as a governess to two small boys. Her husband-to-be arrived in February 1924, and in a month they married.

Frieda spoke little English; Eugene spoke none. The family she worked for moved away, and employment was hard to find. Her job in an "Oshkosh B'Gosh" factory provided enough money for Eugene to attend an auto mechanic's course in Chicago, but a serious bout with yellow jaundice prevented his completing the course. Meanwhile, Frieda grew and sold vegetables on their 10-acre rented farm, attended night school to learn English and began writing for a Milwaukee-based German newspaper.

In 1927 Eugene George Polsfuss was born, the depression loomed and times were bad. Relatives in Georgia painted a "very rosy picture" of a better and easier life in the South, so in 1937 the family moved to Georgia, and, with their total savings, purchased a farm near Bullard in Twiggs County.

Their only daughter, Hermine Georgia arrived in 1938. Life on the farm was difficult. During the Great Depression, the Polsfuss farm and all its machinery were soon lost. When the kaolin mines opened in middle Georgia, Eugene Polsfuss found steady work, and in 25 years at Huber he worked his way to Supervisor.

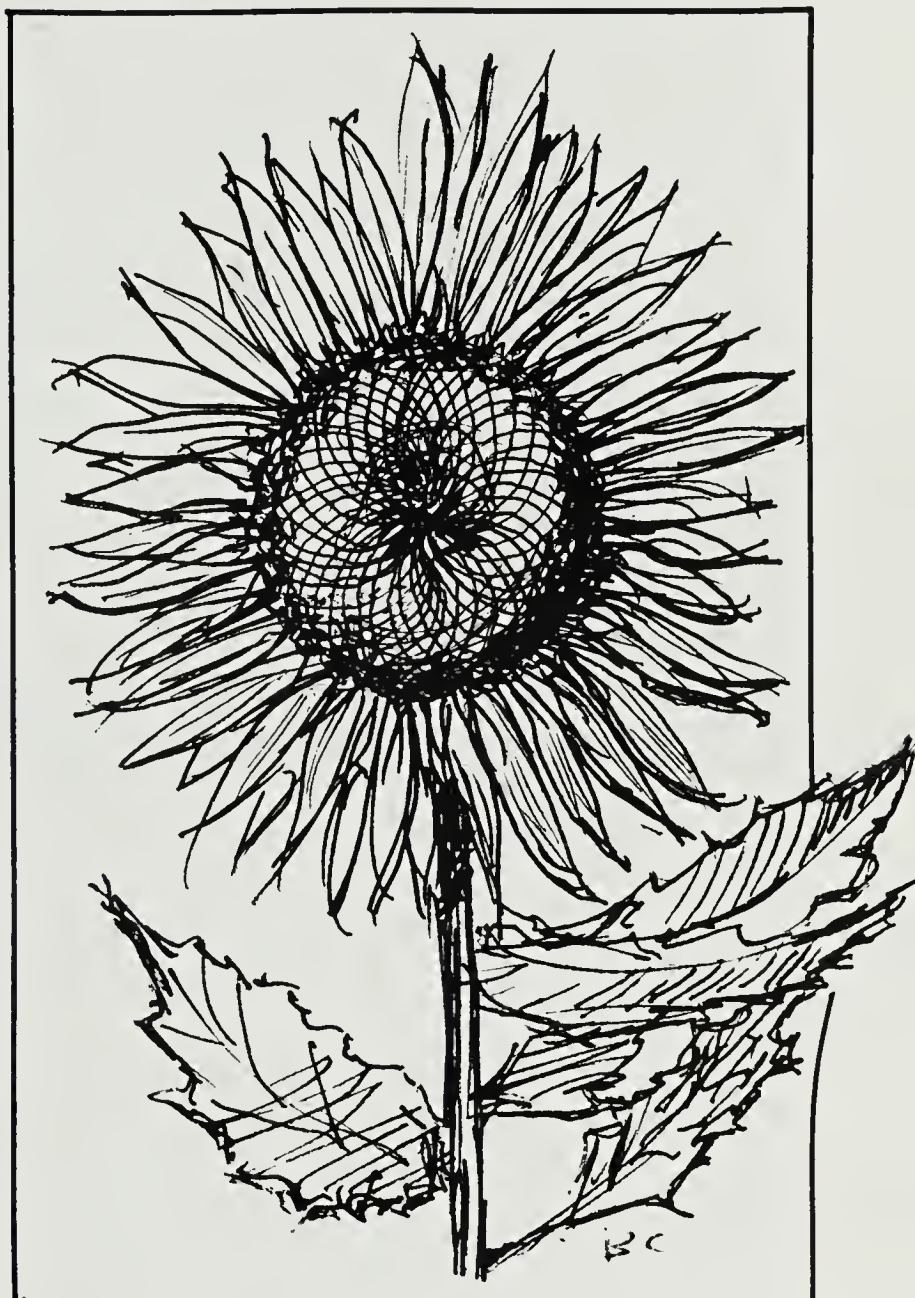
World War II was a difficult time for Frieda, since it was not possible to get any information to or from her family. After the war Frieda was allowed to send mail to Germany, and in one year she sent 84 coffee tins filled with fat. A local butcher collected and saved tallow for her which she then melted down, filled the tins and mailed them to Germany. It helped to save the lives of several family members who had absolutely no other source of fat and even used it to spread on bread.

In 1947 the Polsfusses bought the house where Frieda still lives. To her continuous joy, the lot lies adjacent to government land that remains untouched and is full of botanical surprises — wild orchids, several plants from which she makes tea, and a variety of haws. Frieda has collected and grown over 30 varieties of hardy ferns in her small yard as well as over 100 spring wildflowers, native shrubs and trees, and over 50 types of roses.

Frieda's forester father instilled in her an appreciation of the woods, and she remembers many of the trees and flowers of northern Germany. Her great interest in plants developed when she moved to Georgia. Plants of Wisconsin are not dramatically different from those of her German homeland, but the move south exposed her to a world of new and wonderful plants. On fishing trips with her husband, she searched for new wildflowers while he fished. However, her attempts to find information about these marvelous plants from her friends and neighbors made her wonder why there was so little awareness of and appreciation for the Middle Georgia flora.

Finally in the mid-40's she wrote to the University of Georgia for help in identifying the wildflowers. Dr. Wilbur Duncan was Curator at the Herbarium at that time, and he suggested she send him pressed plants for identification — which she did for over 20 years! He introduced her to Blomquist and Osting's book, "Spring and Early Summer Flora of the Piedmont," and by teaching herself to use keys, she learned to rely more and more on her own ability to identify plants. Her library is full of botanical books, and she has worn out two copies of Taylor's "Encyclopedia of Gardening."

Dr. Duncan feels that Frieda Polsfuss has botanized the wild woods and areas around Macon better than anyone else has, and he expresses gratitude for her information about many rare, unusual and previously unidentified plants in the area. At one time Dr. Duncan was col-



The Sunflower

Once — it was a summer day —
I wandered down a country way, dejected and alone.
My eyes saw only the dust of the street.
How grey everything was, and so tired my feet;
Nothing to brighten my heart.

But then — of a sudden, there yonder
Over the street, I saw a wonder —
The flame of a golden wheel,
A sunflower with its head held high.
Through the dust of the street,
Its smile shone nigh up to the sun.

Thou sunflower there on the country street,
Always alone and in dust your feet,
Gave me a lesson true:
Not downwards, but upwards direct your thought,
Then your soul will never be caught
Sad and discouraged.

lecting *Euphorbia heterophylla* (a weed, he says!) for pharmaceutical studies, so he contacted Frieda for locations of the weed — sure 'nuf, she knew several places where it grew abundantly.

Mr. Polsfuss died in 1974, and with even fewer home responsibilities, Frieda became involved with the Georgia Botanical Society. She graciously credits Bot Soc members for helping her add to her knowledge. She has led field trips, filled in when other leaders needed help with identifications, and has hosted Bot Soc members in her home on numerous occasions.

Marie Mellinger concurs with Dr. Duncan: Frieda is a truly competent botanist. Marie adds that the many fascinating bits and pieces Frieda knew about so many plants made being with her on field trips a special treat. Marie also has fond memories of times she has visited Frieda's home and seen the amazing variety of collected wild plants in her yard along with unusual old-timey cultivated ones.

Bretta Perkins, Interpretive Ranger at the Jarrell Plantation, was about 19 years old when she first met Frieda. Now, years later, she is still amazed that this "older" woman could identify every plant seen on that field trip!

Mrs. Polsfuss' contributions are acknowledged by many. The State's professional botanists consider her a truly outstanding botanist. Wayne Faircloth's article in the *American Fern Journal* in 1981 credits her with the location of *Diplazium japonicum* in Houston County, and she identified the "very rare" Kentucky spleenwort on Brown's Mount as described in Lloyd Snyder's '86 guide. On Arbor Day 1987, 18 live oaks were planted at the entrance to Central City Park to honor 18 of Macon's distinguished citizens — and Frieda was right there with bank presidents and the mayor!

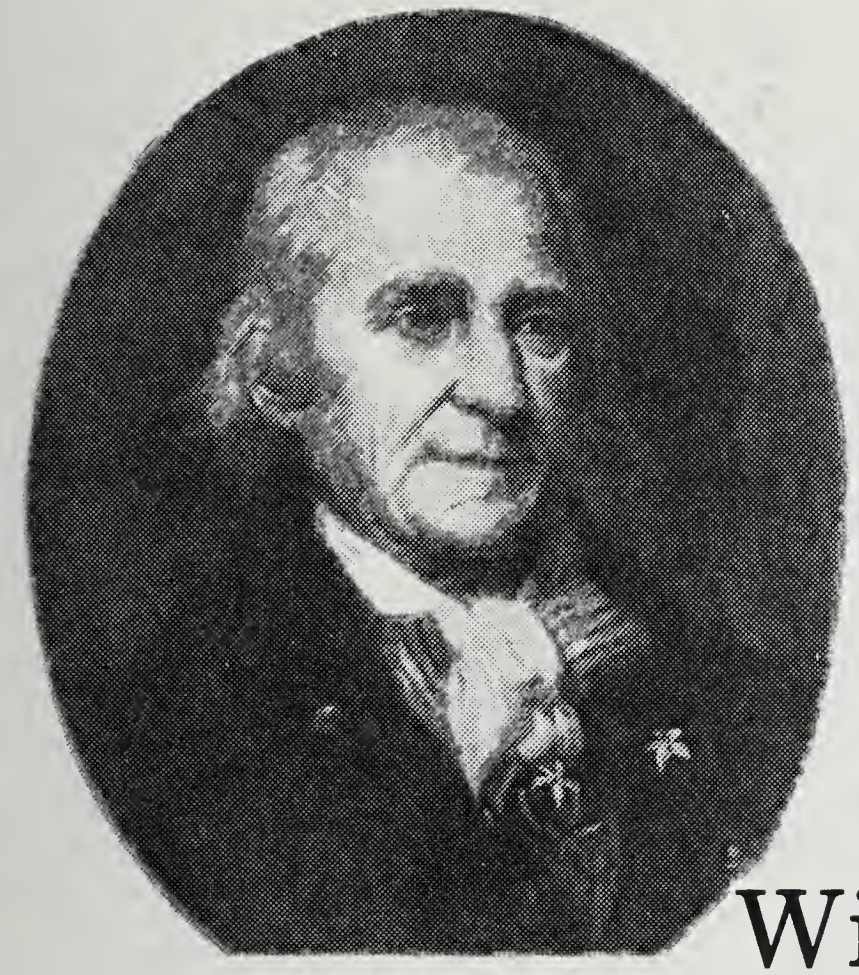
Frieda was a contributor to *Joe's Bulletin,* a mid-west garden bulletin, often writing on the value of saving wildflowers from the bulldozer and using them to landscape. She was one of a committee of three who prepared a plan for replacing native wildflowers and plants at the Ocmulgee National Monument. She has donated the plants in her yard for this project, and many are already in pots awaiting final permission from the Department of the Interior to replant them at the Monument. She also assisted Callaway botanists in locating specific plants.

I first met Fritzie (that is what I now call this special friend) through T.P. Haines, Professor of Biology and Chairman of the Department at Mercer. Fritzie would accompany my Mercer botany class on our field trips throughout the state. Her patience, knowledge and humor were as prized as the supply of assorted baked goodies she always brought along. She also brought along a list of over 250 Middle Georgia plants which she personally "knew."

Frieda was a member of a Garden Club for years and shared her knowledge, plants and recipes with fellow members. In the re-issued "Fancy Foods and Flowers" published by the Federated Garden Clubs of Macon, there are three pages of her recipes.

Two of her special interests these days are her grandchildren—Jennifer, a recent UGA graduate in forestry, and Matt, in high school. Her son Gene lives in North Georgia, and daughter Georgia lives with her husband in California.

Although Frieda's gentle voice has a strong German accent, she is thoroughly familiar with the English language and has written poems in English since 1928. These poems have appeared often in "Bibb Neighbors," a special section of the Macon Tuesday paper, and most often were inspired by flowers. The one reprinted here was written around 1924 or 1925 when Frieda was still in Wisconsin and still learning the English language. I believe it will give you an insight into the spirituality of this great lady.



Through the Eyes of William Bartram

His Studies and Discoveries in Northeast Georgia

By Marie B. Mellinger

WILLIAM BARTRAM (1739-1823) was an early naturalist, known for his detailed descriptions and drawings of plants, as chronicled in "The Travels of William Bartram" edited by Mark Van Doren. He made several trips, the first with his father John Bartram, to Coastal Georgia and Florida. His trip through the mountains and piedmont of South Carolina, Georgia and North Carolina started at Fort Prince George, South Carolina, in either 1775 according to Francis Harper, "Bartram's Travels;" or in 1776 as reported by Mark Van Doren in "Travels of William Bartram" and by Helen Cruickshank in "John and William Bartram's America," the source materials for these excerpts.

Crossing the Chattooga River, he turned northward and made his way up the rugged valley of War Woman Creek, which he called Falling Creek. Near the head of this creek, he turned and followed the trading route that later became Highway 441. He went through Rabun Gap and the valley of the Little Tennessee. Eventually he arrived at Cowee Valley and visited Cherokee villages where he met Chief Attaculla, who persuaded him to return to South Carolina. Little was written of his return journey.

In Bartram's day, botany was an open field; a new species was cause for a shout of joy. William Bartram never lost his sense of awe and wonder, his delight in a new species. He was often vague about time and place, and none of the edited editions of Bartram's travels are explicit as to such details.

Much of Bartram's route was on established trading paths, now super highways. The Bartram Trail cannot pretend to go where Bartram actually walked. But it is a labor of love by many dedicated groups and individuals, and a fitting memorial to

William Bartram and the plants he first discovered and described.—*Marie B. Mellinger*

Started out this day [May 7] with intent to visit the Cherokee Nation. After an agreeable progress for about two miles over delightful strawberry plains and gently swelling green hills, I began to ascend more steep and rocky ridges.... I continued...keeping to the trading path, which led me over uneven, rocky land, crossing rivulets and brooks [until] I came to a charming vale, embellished with a delightful, glittering river.... On my left hand, upon the grassy bases of the rising hills, appeared the remains of a town of the ancients [possibly Tugilo] as the tumuli, terraces, and old peach and plum orchards, etc. sufficiently testify.

[The peach, Prunus persica, *was brought from Asia to Spain, and from Spain to the mission gardens and settlements of the new world. The peach was adopted by the Cherokees at an early date and planted beside their villages. The plum was probably the chickasaw plum* (Prunus angustifolia) *once native west of the Mississippi River and brought eastward by the various Amerindian tribes.]*

***

The road this day led me over uneven country, its surface undulated by ridges and chains of hills,...generally productive of forests...Quercus [oak] of various species, Juglans hickory [black walnut], Fagus sylvatica [beech],...Acer rubrum,...[and] Hopea [*Symplocos*] tinctoria [the horse sugar]. A species of Robinia new to me.... This beautiful flowering tree grows twenty and thirty feet high, with a crooked, leaning trunk. The branches spread greatly and wreath about, some almost touching the ground. However, there appears a singularly pleasing wildness and freedom in its manner of growth, the slender subdivisions of the branches terminate with heavy compound panicles of rose or pink-colored flowers, amidst a wreath of beautiful pinnated leaves. [This was later determined to be *Robinia boyntonii.*]

***

The land was all well timbered, producing lofty forests, with Tilia [basswood], Acer saccharum [sugar maple], Robinia pseudoacacia [black locust], and Stewartia montana [supposedly the first record of the mountain Stewartia].... There were odiferous groves of Calycanthus [sweet shrub], with Halesia [silverbell], Cornus florida all in bloom, Bignonia sempervirens [trumpet creeper], and Lonicera sempervirens [coral honeysuckle].

***

The season being uncommonly wet, with almost daily showers of rain, frequently attended with tremendous thunder, rendered traveling disagreeable, toilsome, and hazardous, through an uninhabited wilderness abounding with rivers and brooks.

***

The land is very fertile, as there is a good depth of loose, dark and moist vegetable mould on a stratum of reddish-brown tenacious clay, and sometimes a deep stratum of dusky brown marl.

***

Foremost in the assembly of mountain beauties, the mountain laurel [*Kalmia latifolia*], the incarnate Robinia, and the flaming azalea [*Rhododendron calendulaceum*].... The epithet firey I annex to this most celebrated species of azalea, as being expressive of the flowers, which are generally of the finest red, orange, and bright gold, as well as yellow and cream color, frequently all the colors and shades are seen in such incredible profusion that we are alarmed with apprehension of the hills being on fire.

***

The Ballad of Billy Bartram

This is the tale of a young man named Billy
Who lived with his Dad in a city called Philly,
But he longed for the country, the forests, and more,
So he followed the coast to the Florida shore.

Chorus: Where have you been, Billy Boy, Billy Boy?
Oh and where have you been, charming Billy?
Oh, I've been to seek a wife, she's the joy of my life;
She's a young thing and cannot leave her mother.

Oh, and where will you go, Billy Boy, Billy Boy?
Oh, and where will you go, charming Billy?
Oh, I'll go o'er rocks and hills, or where'er my spirit wills;
She's a young thing and cannot leave her mother.

Oh, he crossed the broad Savannah, and he crossed the Tugaloo.
He met the Cherokees at home, among the mountains blue.
He met old At-a-kulla where the winding river wends.
He greeted all the Cherokees, and always called them friends.

Chorus: And where have you been Billy Boy, Billy Boy?
And where have you been charming Billy?
To the River Tennessee, where I met a Cherokee;
She's a young thing and cannot leave her mother.

Oh, and where will you go Billy Boy, Billy Boy?
And where will you go, charming Billy?
Oh, I'll go o'er rocks and rills, or where'er my spirit wills;
She's a young thing and cannot leave her mother.

—Anonymous

[Near the river, another new species appeared, the Rhododendron later known botanically as *R. minus* or *R. caroliniana*]: This species of rhododendron grows six or seven feet high; many nearly erect stems arise together from the root, forming a group or coppice. The leaves are three or four inches in length, of an oblong figure, broadest toward the extremety, and terminating with an obtuse point; their upper surface of a deep green and polished, but the nether surface of a rusty iron color.... The numerous flexible branches terminate with a loose, spiked raceme, or cluster of large deep-rose-colored flowers, which, with the whole plant, possesses an agreeable perfume.

***

[Proceeding through a shady forest]: ... a new and beautiful species of that celebrated family of flowering trees [Magnolias] which here, at the cascades of Falling Creek, grows in a high degree of perfection.

***

This tree, Magnolia auriculata, or perhaps rather shrub, rises eighteen to thirty feet in height; there are usually many stems from a root or source, which lean a little, or slightly diverge from each other. In this respect imitating the Magnolia tripetala. The crooked wreathing branches arise and subdivide from the main stem without order or uniformity. Their extremities, turn upwards, producing a very large rosaceous, perfectly white, double or polypetalus flower, which is of a most fragrant scent. This fine flower sits in the center of a radius of very large leaves....terminating that way with two long narrow ears or lappets, one on each side of the insertion of the petiole. [Later botanists changed the name to *Magnolia fraseri*.]

***

Past mid-day, I sought a cool, shaded retreat where was water for refreshment and grazing for my horse—my faithful slave and only companion.

On approaching these shades, between the stately columns of the superb forest trees, [there was] presented to view, rushing from rocky precipices under the shade of the pensile hills, the unparalleled cascade of Falling Creek, rolling and leaping off the rocks.... I here seated myself on the moss-clad rocks, under the shade of spreading trees and floriferous fragrant shrubs, in full view of the cascades.

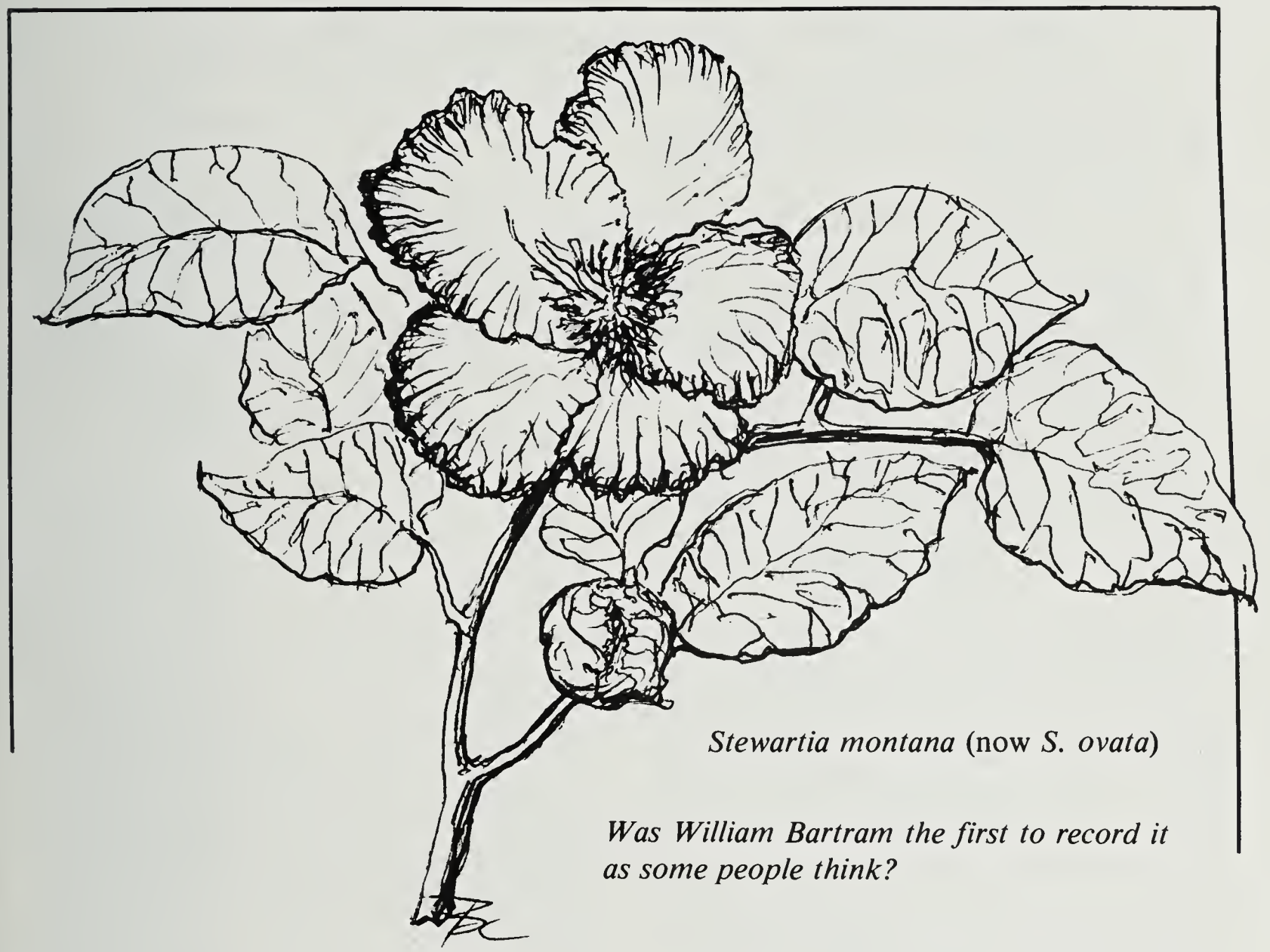
At this rural retirement were assembled a charming circle of mountain vegetable beauties:...Anemone thalictroides [rue anemone], Anemone hepatica,...Trillium sessile, Trillium cernuum...Sanguinaria [bloodroot], Viola uvularia [he doesn't say which color], Epigaea [trailing arbutus]... Mitchella repens [partridge berry] etc. Some of these roving beauties stroll over the mossy, shelving, humid rocks....some plunge their perfumed heads and bathe their flexile limbs in the silver stream, whilst others,...their blooming tufts bespangled with pearly and crystalline dewdrops collected from the falling mists, glistening in the rainbow arch. Having collected some valuable specimens at this friendly retreat, I continue my lonesome pilgrimage.

***

I came to a fertile vale enamelled with the incarnate Fragrant strawberries [*Fragaria*]. [Later, near Cowee, Bartram writes extensively and enthusiastically of the Cherokee maidens picking strawberries, and welcoming him to their midst.]

***

There rolled on before me, a delightful brook, waters of the Tanase [Tennessee].... I observed growing in these mountain meads, Sanguinaria canadensis [bloodroot], and



Stewartia montana (now *S. ovata*)

Was William Bartram the first to record it as some people think?

Heracleum maximum [masterwort]. The Sanguinaria is one of the plants employed by the Northern Indians as a pigment, the same is found in the country of the Cherokees.... Also a confusion of white convollaria used by the aborigines to purify the blood [actually the Solomon's plume *Smilacina racemosa,* and the *Polygonatum,* Solomon seal].

***

Here [in Rabun Gap] I observed a little grove of the Cassine yapon, which was the only place where I had seen it grow in the Cherokee country; the Indians call it the beloved tree, and are very careful to keep it pruned and cultivated: they drink a very strong infusion of the leaves, buds, and tender branches of this plant, which is so celebrated, indeed even venerated, by the Creeks and all the Southern maritime nations of Indians. [There was a small grove of the Ilex, or Cassine, growing in Rabun Gap until it was obliterated by the widening of the road.] The Cherokees learned the busk, or green corn dance, from the Creeks, along with the use of the black drink.

***

I observed there a new specimen having large, sinuated leaves, and white flowers [probably the umbrella leaf, *Diphylleia].* The angelica lucida, or nondo root [*A. venenosa*] grows here in abundance, it is held in high esteem with the Indians, as well as the white inhabitants, and sells at a great price.

There were scenes of mountainous landscape, westward, vast and varied, a ridge of mighty hills called the Jore mountains [the Nantahalas].... The world a glorious apartment of the boundless palace of the sovereign Creator is furnished with an infinite variety of scenes, inexpressibly beautiful and pleasing.

Book Report

Georgia's Expanding Flora Recorded in Recent Atlas

By Marie B. Mellinger

The Distribution of the Vascular Flora of Georgia, by Samuel B. Jones, Jr. and Nancy C. Coile, Department of Botany, University of Georgia.

DOING AN ATLAS is, as we know, a monumental undertaking. This book has an attractive format, with *Elliottia racemosa* on the cover. Vacant maps are added for the addition of further discoveries.

The authors have added immensely to the discoveries of new species, in new localities. Work on the most northwesterly counties—Dade, Walker, and Catoosa— has added new dimensions, especially to the flora of the Cedar Glades. Many Florida plants seem to be finding their way into Georgia, especially into Seminole and Decatur counties in the extreme southwestern corner of Georgia. The atlas also opens our eyes to the number of hybrids which occur in certain genera!

No authorities are given. It is impossible to tell whether the taxonomic name goes back to Linnaeus or to Michaux. There is no one to account to, nor to applaud, for the many changes in nomenclature. This may make the book a better challenge for the research student who must discover who was responsible for naming *Consolida ambigua,* for example, or for changing *Specularia* to *Triodanis,* or *Panicum* to *Steinchisma.* There are no common names; synonyms (for genera only) appear in the index and nowhere else. For easy finding, plants are listed in alphabetical rather than in botanical order.

All records are documented by collected specimens in the University of Georgia Herbarium. The nomenclature is according to USDA, SCS-TP-159, the "National List of Scientific Plant Names" (1982).

The Atlas is free and may be picked up at the Botany Department. A $3.00 shipping and handling fee is required if ordered from the Department. Write to: The University of Georgia, Department of Botany, Athens, Georgia 30602.

First Person Singular

A Travelling Oriental

By A. M. Oshlag, M.D.

When Georgia Botanical Society members were guests of George Sanko and the DeKalb College on January 21, 1989, Dr. Oshlag brought a spray of flowers with a pleasant and unusual odor to share with us. He gave us the following account, then agreed to repeat it for this column.

ABOUT twenty-five years ago, a patient came to my office in Griffin, Georgia, with a bouquet that perfumed the entire office. Before I thought about rooting cuttings from the branches, they had died.

When the lady returned to the office several weeks later, I asked if I could get some cuttings. She suggested that I stop by when I was in her neighborhood. When I did visit her, she handed me a shovel and said that I could have the whole plant! Needless to say, I dug the plant. When asked for the identity of the plant, she told me the following story.

When Admiral Perry "opened up" the Orient in 1853, one of the captains in the fleet was Captain John MacIntosh Kell. When Captain Kell returned to his home in Darien, Georgia, he brought this plant with him. Subsequently, Captain Kell's great-grandson, H.V. Kell, moved to Sunny Side a few miles north of Griffin and brought some of the plant with him. It is this plant that has been blooming in my yard in January for the past twenty-five years.

Dr. B.B. Higgins of the Georgia Experiment Station identified the plant as Chimonanthus praecox, *which is a Chinese plant that belongs to the sweet shrub* (Calycanthaceae) *family.*

Assimilating the Natives

Some Southeastern Native Plants for Landscape Use

By Samuel B. Jones, Jr.

A FORTUNATE by-product of my professional work has been the chance to advance one of my favorite causes—promoting the use of native plant material in regional gardens.

My interest in the use of native plants comes from early training in ornamental horticulture and from the experience of nearly thirty years of botanical field work in the Southeast. The usefulness of our regional plant material was reinforced during preparation of a book, *Shrubs and Woody Vines of the Southeast: Their Identification and Landscape Use*. The book, a joint undertaking with Leonard Foote, has been published recently by Timber Press.

On a practical level my wife Carleen and I began a perennial nursery six years ago. At Piccadilly Farms near Athens, we grow a number of native herbacious perennial wildflowers and hardy native ferns for the wholesale and retail trade.

Experiences in field work and observation of the changing land-use patterns in this area have convinced me that many of our native plants are likely to survive only in cultivation. *Franklinia* and *Torreya* are examples. *Franklinia* is now known only in cultivation, and *Torreya*, barely managing to survive in the wild, is being successfully cultivated.

We should work toward including more natives in our garden landscapes as a preservation tactic. Note the present interest in native azaleas, which was stimulated by the work of Fred Galle at Callaway Gardens. Few nurseries were even growing native azaleas 20 years ago, but now they are widely available. As a positive conservation technique, we should propagate our native plant material and promote its use in the garden.

Who among us is not bored with the overuse of common nursery shrubs and annuals? Red Tip Photinias and the omnipresent red salvias and marigolds come to mind. Anyone can buy a six-pack of zinnias and, with reasonable care, have terrific results. But some of you may want to go beyond this. The challenge of growing and propagating natives, locating the plant material, duplicating conditions found in nature, studying and observing the native plants in our gardens throughout the year provide rewards of a sort not found with the everyday plant.

Before presenting a list of some suggested southeastern natives, there are a few general points I'd like to make. First, *use only nursery-propagated native plant material.* Do not dig from the wild. How can you tell whether or not a plant is nursery propagated? The

best guarantee is the reputation of the nursery or plant source. (See some sources noted at the end of the plant lists.)

A second point to remember is that native species will not always outperform a non-native. Witness those Japanese imports: kudzu and honeysuckle. But, many natives will grow very well in our gardens if placed in a suitable site and given reasonable care.

In fact, many natives will appear much more attractive in our gardens than they did in the wild, given less competition and an adequate supply of light, moisture, and nutrients.

Third, because plants are native to our area does not mean they can be neglected or that they will need less care. Native plants, like all plants, need water, fertilizer, soil preparation, proper siting and plenty of tender loving care.

Most nurseries in the Southeast grow their plants in a shredded pinebark mix. It is a good idea when transplanting container-grown stock to remove the pinebark and spread out the roots to get them in contact with the native soil.

Also, good garden design should be considered when placing the plants. An array of native plants stuck here and there by a plant collector will not provide an appealing garden scene. Have a plan designed to create a garden setting and then stick to your plan. Basically, in using native plant material just follow the rules of good gardening procedures.

In our book, Len Foote and I have included a great deal of information on the landscape use of our native shrubs and woody vines which you will find helpful in planning and planting your garden.

The following list gives a selection of desirable native ferns, herbaceous perennials, shrubs and trees which you might also wish to use in your garden.

Some Southeastern

Ferns

Adiantum pedatum - Maidenhair Fern
Athyrium asplenioides - Southern Lady Fern
Dryopteris goldiana - Goldie's Wood Fern
Dryopteris marginalis - Marginal Wood Fern
Lorinseria areolata - Netted Chain Fern
Onoclea sensibilis - Sensitive Fern
Osmunda cinnamomea - Cinnamon Fern
Osmunda regalis - Royal Fern
Polystichum acrostichoides - Christmas Fern
Pteridium aquilinum - Bracken
Thelypteris kunthii - Wood Fern

Woody Vines

Bignonia capreolata - Cross vine
Brunnichia cirrhosa - Ladies'-eardrops
Campsis radicans - Trumpet vine
Celastrus scandens - Bittersweet
Decumaria barbara - Climbing Hydrangea
Gelsemium sempervirens - Carolina Jessamine
Lonicera sempervirens - Coral Honeysuckle
Parthenocissus quinquefolia - Virginia Creeper
Smilax lanceolata - Southern Smilax
Wisteria frutescens - American Wisteria

Low Shrubs (6 in.-4 ft.)

Calamintha georgiana - Georgia Basil
Ceanothus americanus - New Jersey Tea
Diervilla sessilifolia - Bush Honeysuckle
Fothergilla gardeni - Dwarf Fothergilla
Gaultheria procumbens - Wintergreen
Hydrangea arborescens - Smooth Hydrangea
Ilex glabra - Inkberry
Leiophyllum buxifolium - Sand Myrtle
Leucothoe axillaris - Dog-hobble
Rhus aromatica - Fragrant Sumac
Robinia hispida - Bristly Locust
Vaccinium crassifolium - Creeping Blueberry
Viburnum acerifolium - Mapleleaf Viburnum

Medium Shrubs (4-8 ft.)

Aesculus sylvatica - Georgia Buckeye
Amelanchier spicata - Serviceberry
Amorpha fruticosa - Wild Indigo
Aronia arbutifolia - Red Chokeberry
Calycanthus floridus - Sweetshrub
Callicarpa americana - Beauty-berry
Cornus alternifolia - Alternate-leaved Dogwood
Corylus americana - Hazel-nut
Croton alabamensis - Alabama Croton
Euonymus americanus - Strawberry Bush
Fothergilla major - Fothergilla
Hydrangea quercifolia - Oakleaf Hydrangea
Ilex coriacea - Large-leaved Gallberry
Itea virginica - Virginia Willow
Kalmia angustifolia - Sheep-kill
Leucothoe racemosa - Leucothoe
Lyonia lucida - Fetterbush
Rhododendron minus - Carolina Rhododendron
Vaccinium stamineum - Squawberry

+ Give a *Tipularia* Associate Membership to a friend for Christmas—or for any other occasion.

+ For only $7.00 a year, your friend will receive two issues of *Tipularia*. We feel that they will be delighted with such a unique gift.

+ HOW UNIQUE IS IT?
—As an example: Beginning with the Fall 1989 issue, *Tipularia* will have a Wild Edibles page which will include a recipe with identification of the plant or plants involved.

+ A card, announcing that the gift is from you, will accompany the first issue to be received.

+ Check should be made out to: Georgia Botanical Society.

+ Fill out the form below and mail with your check to:

Suzanne S. Jackson
3461 Ashwood Lane
Chamblee, GA 30341.

_____

Name of Recipient

_____

Street *Apt. #*

_____

City *State* *Zip Code*

_____

Your Name *(and address if it has changed recently)*

Native Plants for Landscape Use

Large Shrubs (6-15 ft.)

Aesculus parviflora - Bottlebrush Buckeye
Aesculus pavia - Red Buckeye
Agaristra populifolia - Leucothoe
Aralia spinosa - Devil's Walking Stick
Baccharis halimifolia - Groundsel
Cephalanthus occidentalis - Buttonbush
Chionanthus virginicus - Fringe-tree
Cliftonia monophylla - Buckwheat Tree
Cornus amomum - Swamp Dogwood
Crataegus marshallii - Hawthorn
Cyrilla racemiflora - Titi
Elliottia racemosa - Georgia Plume
Franklinia altamaha - Lost Gordonia
Gordonia lasianthus - Loblolly Bay
Hamamelis virginiana - Witch-hazel
Ilex amelanchier - Sarvis Holly
Ilex cassine - Dahoon
Ilex decidua - Possumhaw
Ilex myrtifolia - Myrtle Holly
Ilex verticillata - Winterberry
Ilex vomitoria - Yaupon
Kalmia latifolia - Mountain Laurel
Myrica cerifera - Wax Myrtle
Neviusia alabamensis - Snow-wreath
Osmanthus americanus - Devilwood, Wild Olive
Persea borbonia - Red-bay
Philadelphus inodorus - Mock-orange
Physocarpus opulifolius - Ninebark
Pinckneya bracteata - Fever Tree
Ptelea trifoliata - Hop-tree, Wafer-ash
Rhus copallina - Winged Sumac
Rhus glabra - Smooth Sumac
Rhus typhina - Staghorn Sumac
Rhododendron alabamense - Alabama Azalea
Rhododendron arborescens - Sweet Azalea
Rhododendron atlanticum - Coastal Azalea
Rhododendron austrinum - Florida Azalea
Rhododendron calendulaceum - Flame Azalea
Rhododendron canescens - Piedmont Azalea
Rhododendron catawbiense - Purple Laurel
Rhododendron flammeum - Oconee Azalea
Rhododendron prunifolium - Plum-leaf Azalea
Rhododendron maximum - Great Laurel
Staphylea trifolia - Bladdernut
Stewartia malacodendron - Silky Camellia
Stewartia ovata - Mountain Camellia
Styrax americana - Storax
Styrax grandifolia - Snowell
Symplocos tinctoria - Sweet Leaf
Horse Sugar
Vaccinium arboreum - Sparkleberry
Viburnum dentatum - Arrow Wood
Viburnum nudum - Viburnum
Viburnum prunifolium - Black Haw
Viburnum rufidulum - Blue Haw
Yucca aloifolia - Spanish Bayonet
Yucca filamentosa - Beargrass

Small Trees (15-35 ft.)

Acer leucoderme - Chalk Maple
Carpinus caroliniana - Hornbeam, Ironwood
Cercis canadensis - Eastern Redbud
Cornus florida - Flowering Dogwood
Cotinus americanus - Smoketree
Halesia carolina - Carolina Silverbell
Halesia diptera - Two-wing Silverbell
Ilex opaca - American Holly
Magnolia ashei - Ashe Magnolia
Magnolia pyramidata - Pyramid Magnolia
Magnolia virginiana - Sweet Bay
Nyssa ogeche - Ogeeche Plum, Ogeeche Lime
Ostrya virginiana - Hop-hornbeam
Oxydendrum arboreum - Sourwood
Planera aquatica - Water-elm
Prunus caroliniana - Laurel Cherry
Sabal palmetto - Cabbage Palm
Torreya taxifolia - Stinking Cedar

Standard trees (over 35 ft.)

Acer barbatum - Southern Sugar Maple
Acer saccharum - Sugar Maple
Betula nigra - River Birch
Celtis occidentalis - Hackberry
Cladrastis kentukea - Yellow-wood
Diospyros virginiana - Common Persimmon
Fagus grandifolia - American Beech
Liquidambar styraciflua - Sweetgum
Liriodendron tulipifera - Tulip Tree
Magnolia acuminata - Cucumber Tree
Magnolia grandiflora - Southern Magnolia, Bull Bay
Nyssa aquatica - Water Tupelo
Nyssa sylvatica - Black-gum
Pinus glabra - Spruce Pine
Pinus palustris - Long-Leaf Pine
Pinus strobus - Eastern White Pine
Pinus virginiana - Virginia Pine, Scrub Pine
Platanus occidentalis - American Sycamore
Quercus alba - White Oak
Quercus coccinea - Scarlet Oak
Quercus falcata - Southern Red Oak
Quercus laurifolia - Laurel Oak
Quercus lyrata - Overcup Oak
Quercus michauxii - Swamp Chesnut Oak
Quercus montana - Chestnut Oak
Quercus nigra - Water Oak
Quercus pagodaefolia - Cherrybark Oak,
Swamp Spanish Oak
Quercus palustris - Pin Oak
Quercus phellos - Willow Oak
Quercus rubra - Red Oak
Quercus virginiana - Live Oak

Some Southeastern Native Plants for Landscape Use (Continued)

Herbaceous Perennials

(In many instances, additional species within the genus may be suitable)

Amsonia tabernaemontana - Blue Star
Aquilegia canadensis - Columbine
Arisaema dracontium - Green Dragon
Arisaema triphyllum - Jack-in-the-Pulpit
Asarum arifolium - Heart Leaf
Asarum canadense - Wild Ginger
Asarum shuttleworthii - Shuttleworth's Ginger
Asclepias tuberosa - Butterfly-weed
Aster species - Aster
Baptisia australis - Blue Wild Indigo
Baptisia pendula - Wild Indigo
Chasmanthium latifolium - Upland Sea-Oats
Chelone lyoni - Turtlehead
Chrysogonum virginianum - Green & Gold
Coreopsis auriculata - Coreopsis
Dentaria diphylla - Toothwort
Dicentra eximia - Bleeding Heart
Dodecatheon meadia - Shooting-star
Echinacea purpurea - Purple Cone Flower
Erigeron pulchellus - Robin's Plantain
Geranium maculatum - Wild Geranium
Helianthus angustifolius - Sunflower
Heliopsis helianthoides - Ox-eye
Hepatica nobilis - Liverleaf
Heuchera americana - Alum Root
Hibiscus moscheutos - Wild Cotton
Hydrophyllum canadense - Waterleaf
Hymenocallis species - Spider Lily
Iris cristata - Dwarf Iris
Jeffersonia diphylla - Twin Leaf
Liatris spicata - Blazing Star
Lobelia cardinalis - Cardinal Flower
Lobelia siphilitica - Great Lobelia
Mertensia virginica - Virginia Blue Bells
Mitella diphylla - Miterwort
Monarda didyma - Bee-balm
Monarda fistulosa - Horsemint
Oenothera fruticosa - Sundrops
Pachysandra procumbens - Alleghany Spurge
Penstemon smallii - Beard Tongue
Phacelia bipinnatifida - Phacelia
Phlox carolina - Phlox
Phlox divaricata - Blue Phlox
Phlox stolonifera - Creeping Phlox
Polygonatum biflorum - Solomon's Seal
Pycnanthemum incanum - Mountain Mint
Sanguinaria canadensis - Bloodroot
Shortia galacifolia - Oconee Bells
Silene polypetala - Fringed Campion
Silene virginica - Fire Pink
Sisyrinchium angustifolium - Blue-eyed Grass
Similacina racemosa - False Solomon's Seal
Solidago species - Goldenrod
Stokesia laevis - Stoke's Aster
Stylophorum diphyllum - Woody Poppy
Thermopsis villosa - Bush Pea
Tiarella cordifolia - Foamflower
Tradescantia virginiana - Spiderwort
Trillium species - Wake Robin
Uvularia perfoliata - Bellwort
Vernonia noveboracensis - Ironweed
Viola pedata - Birdfoot Violet
Zephyranthes atamasco - Atamasco Lily

For a list of selected literature to aid in the identification of the vascular plants of the United States consult:

Jones, S. B. and A. E. Luchsinger. 1986. "Plant Systematics." 2nd ed. McGraw-Hill Book Co., NY (cf. pgs. 253-260; 459-475).

These plant sources offer a variety of native plant materials that are nursery propagated and grown:

Eco-Gardens
P.O. Box 1227
Decatur, GA 30031

Holbrook Farms
Route 2, Box 223B
Fletcher, NC 28732

Louisiana Nursery
Rt. 7, Box 43
Opelousas, LA 70570

Magnolia Nursery
Rt. 1, Box 87
Chunchula, AL 36521

Native Gardens
Rt. 1, Box 494
Greenback, TN 37742

Native Nurseries
1661 Centerville Road
Tallahassee, FL 32308

Piccadilly Farms
1971 Whippoorwill Rd.
Bishop, GA 30621

Salter Tree Farm
Rt. 3, Box 1332
Madison, FL 32340

Transplant Nursery
Parkertown Road
Lavonia, GA 30553

We-Du Nurseries
Rte. 5, Box 724
Marion, NC 28752

Woodlander's, Inc.
1128 Colleton Ave.
Aiken, SC 29801

Book Report

A Tree Book for Field and Library

By L. Scott Ranger

Trees of the Southeastern United States, by Wilbur H. Duncan and Marion B. Duncan, The University of Georgia Press, 1988. xi, 322 pages. 281 illustrations in color. $19.95.

THE REAL ASSET of this book is that it includes *every one of the 306 species* of trees reproducing naturally in the area bounded by the Mason-Dixon Line, the Ohio and Mississippi Rivers and all of Arkansas and Louisiana, but omitting most of peninsular Florida.

Written primarily as a guide to identification, it is not a natural history of southeastern trees. This helps to explain the Duncans' choice of photographs, most of which are excellent. No habit (whole tree) or winter shots are to be found. The pictures are generally successful in illustrating key diagnostic features of each tree. Only 30 trees lack photographs.

In a "Note to the Amateur," that all should follow, the Duncans warn against the "thumb-through" method and encourage the use of their dichotomous keys. The easily intimidated can breathe easy, for the keys are conquered quickly using a very limited technical vocabulary. There is a small glossary and a diagram of structures to help with the vocabulary that is used.

Focusing almost exclusively on vegetative (non-flowering) features, the first key places the tree at hand into one of eleven artificial groups based upon leaf characteristics. The next key is to the genera of that group followed by a species key for genera with more than one. Presumably to make keying easier, families are omitted.

The text follows the artificial groupings. This makes it difficult for anyone using the thumb-through method and even for those familiar with a phylogenetic or alphabetical arrangement. Trees are listed by family in the text, but because families can have differing leaf features, the listing is not necessarily complete for each family. Use the index or the key!

The distribution maps take a bit of getting used to, but once understood, offer a great deal of information. The entire range within an area from southern Canada south, and west as far as the 100th meridian, is shown by dots of two sizes, the larger meaning that the tree is common; the smaller, that it is uncommon. The dots are centered in the area of distribution, and more than one dot may be found for each state where another area may be encountered.

My major disappointment is the separation of the photograph from the text. Production costs obviously made this decision. I would pay more to have them together. The photographs are arranged by number, the same as the species in the text (skipping the 30 not illustrated). The family name is used but in a most confusing manner. On each two-page spread, the first and last family names are printed at the top like words in a dictionary. But unless one knows the family of each, where they change on these pages is a mystery. Since they confuse, either all family names should be printed or none.

Using the metric system works well for plant measurements, but fails for those of us who have no "feel" for metric elevations above sea level. I would prefer that feet be used here or at least both systems be given for elevations.

A footnote is required for the "every species" listing. Due to the complexity and lack of taxonomic agreement, only six species of *Crataegus* (Hawthorn) are given, and there is no key to help. Here is an area crying for work. Anyone out there want to try?

This book immediately jumps to the top of the pile for trees in the Southeast and belongs in any tree lover's library.

Did you know...?

Did you know that *Tipularia discolor* (Pursh) Nuttall, the crane-fly orchid, appears statewide according to the Georgia Botanical Society's "Atlas of the Vascular Flora of Georgia" and that it is for this reason *Tipularia* was selected to be the name of the Society's magazine?

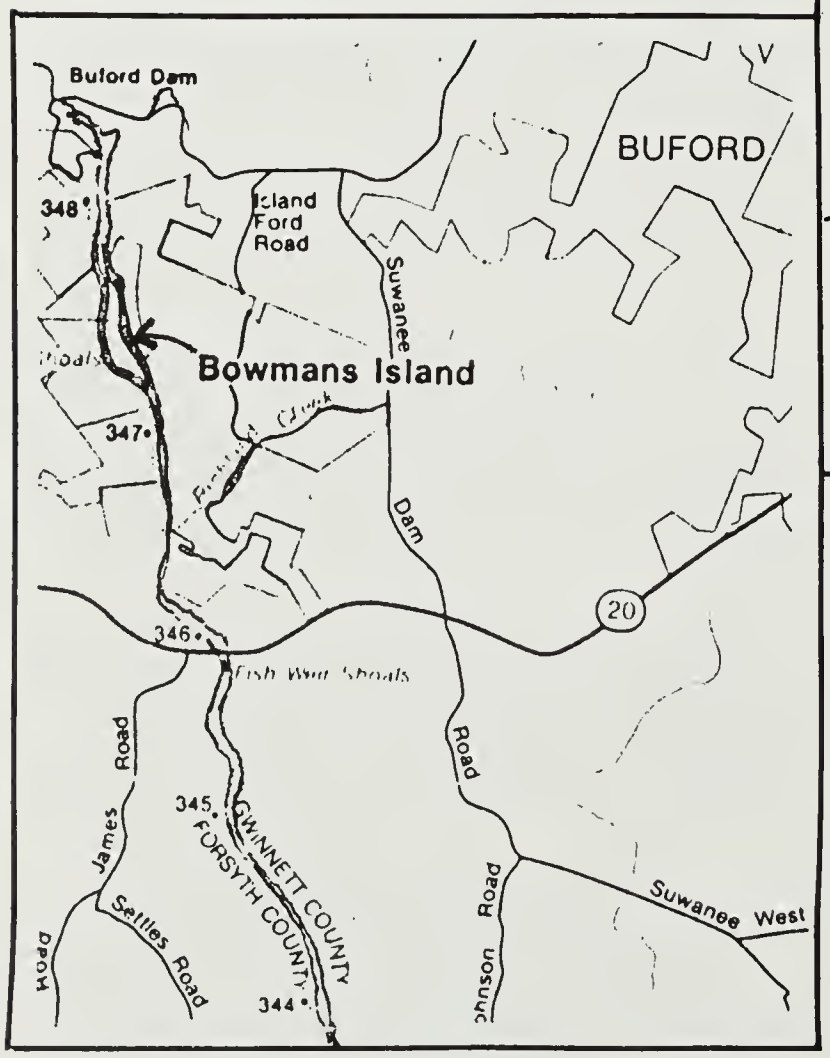
Site-Seeing

Urban River Riches

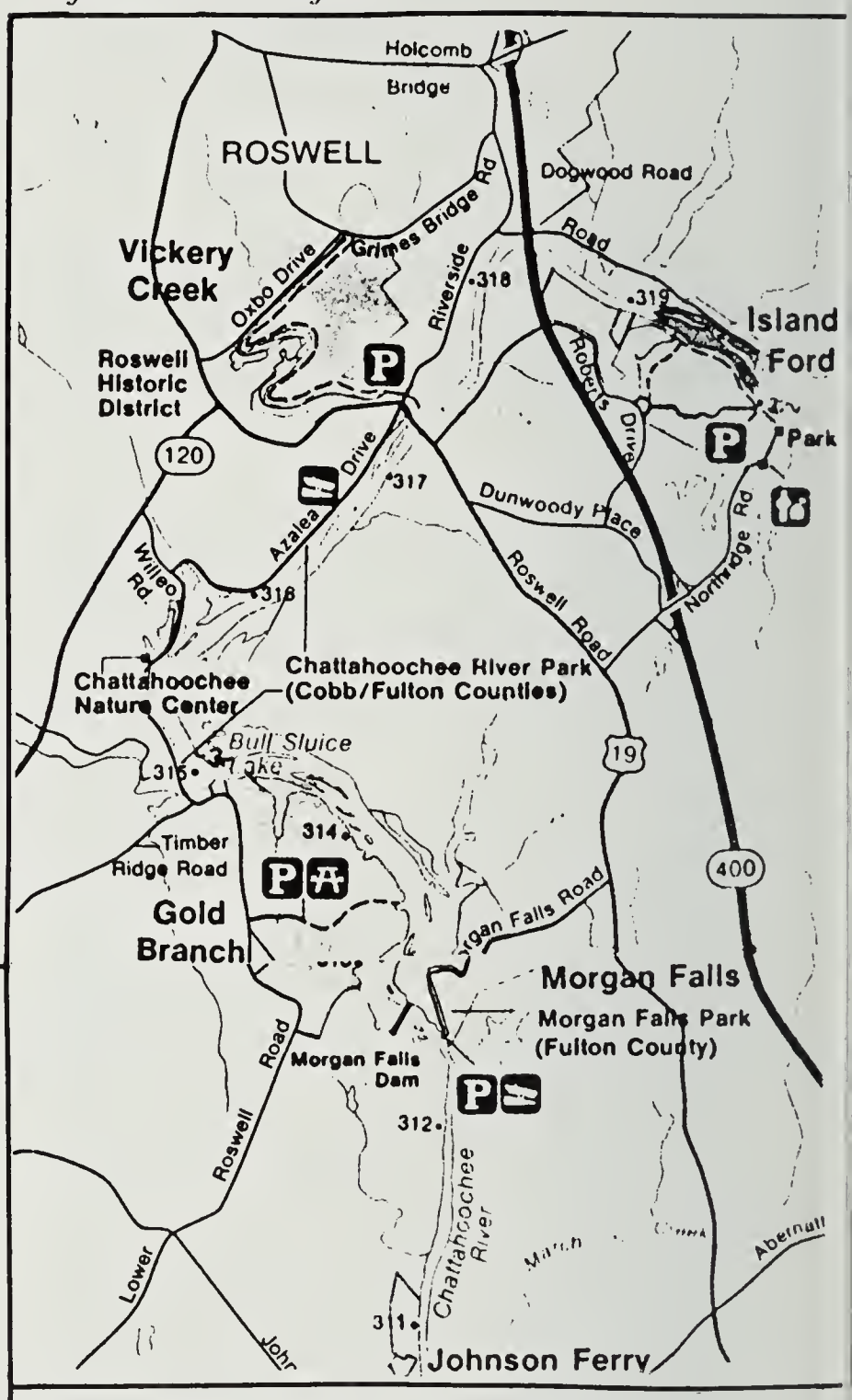
By Jerry Hightower

THE CHATTAHOOCHEE RIVER CORRIDOR is an extension of the rich botanical diversity of our southern Appalachians. However, much of the corridor's botanical wealth has been lost or altered by agricultural development, particularly in the Metropolitan Atlanta area. In 1978 the citizens, through the Congress, entrusted stewardship of 14 parcels of land along the river to the National Park Service. Many of the surviving enclaves of this botanical diversity were then protected.

Unfortunately, many of these enclaves are also virtually unknown. With few exceptions, this wealth of wildflowers and ferns can be reached by easy to moderate park trails. Protected, rare and unusual plants are but a short drive and walk away. Therefore, I will share a few of the Chattahoochee's long kept secrets.



After dropping 197 feet, the Chattahoochee emerges from the base of Buford Dam in Forsyth County and flows through the Bowman's Island Unit of the Chattahoochee River National Recreation Area. Although the area is undeveloped and without parking lots, the adventurous botanizer can find spider lily and the mountain form of foam flower, *Tiarella cordifolia* var. *cordifolia*.

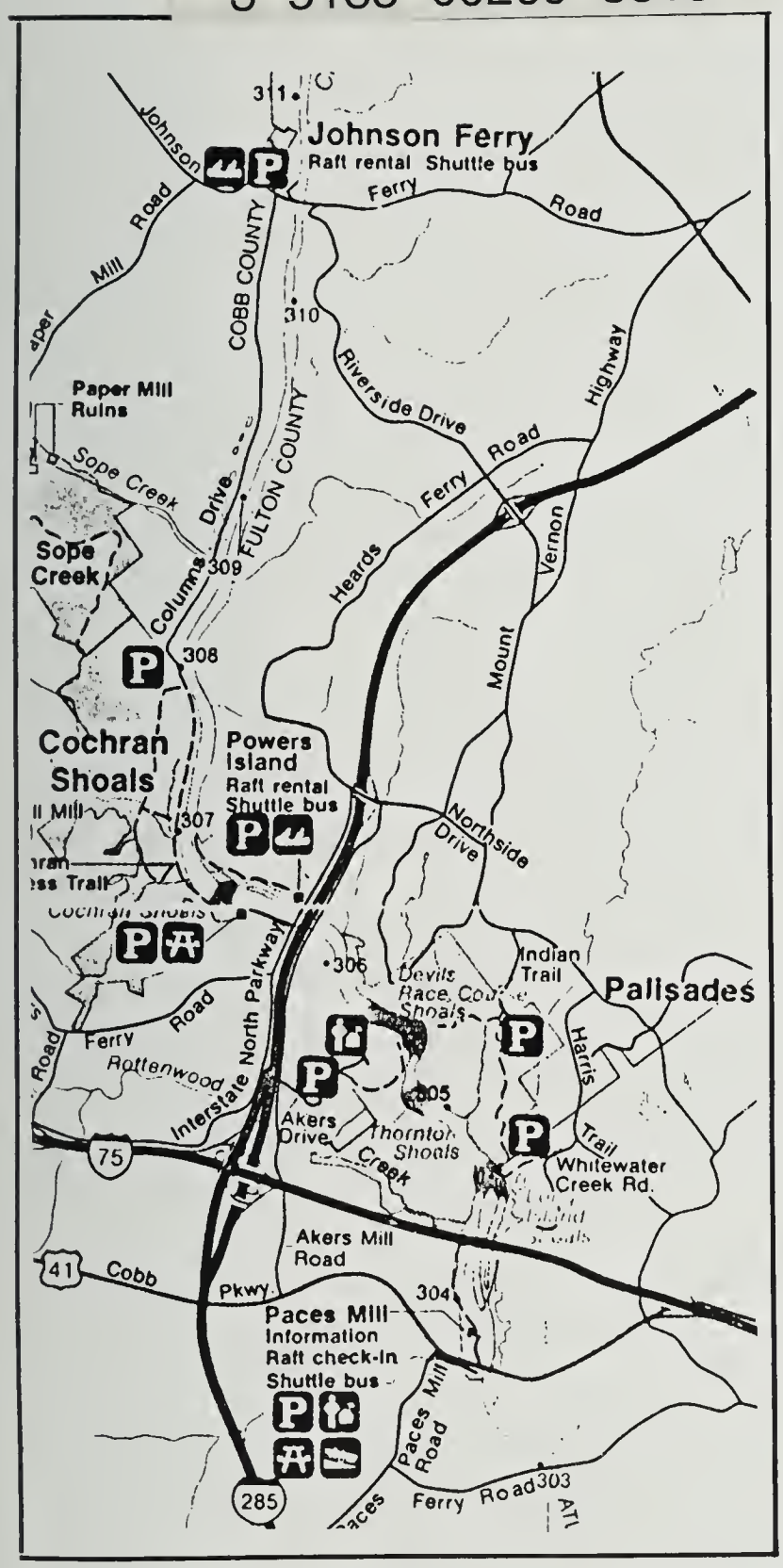


In northern Fulton County the ravines and northfacing slopes of the Island Ford Unit are covered with a myriad of woodland wildflowers and ferns. Catesby, nodding and sessile trilliums are common. Although severely affected by three seasons of drought, yellow lady slipper can still be occasionally found. A number of rock outcrops are host to the somewhat rare alumroot, *Heuchera parviflora.*

Flowing through historic Roswell, Vickery Creek Ravine has the largest concentrations of *Magnolia macrophylla* and *Magnolia tripetala* in the park.

Aconitum uncinatum, or monkshood, occurs in the park only on Gold Branch Cove along the shores of Bull Sluice Lake in late summer. Pink lady slipper and ginseng also grow in the Gold Branch Unit.

New York Botanical Garden Library
3 5185 00269 3818



Less than 100 yards from the Cochran Shoals picnic area, spring beauty carpets the base of a northfacing slope which supports a fantastic array of ferns and wildflowers. In June the tiny red flowers of the rare and threatened bay star vine, *Schisandra glabra,* bloom along the river adjacent to the shoals.

Across the river, the 87-acre Powers Island Unit has an easy walking, half-mile floodplain forest loop trail and a quarter-mile ravine loop trail. The ravine trail, the Rock Springs Wildflower Path, was specifically designed for wildflower study and observation. The most impressive display of bloodroot on the river opens here every March. Shrubs include rosebay rhododendron and mountain leucothoe.

This area has been officially designated as a repository for plants rescued elsewhere in the river corridor. This wildflower path is a superior spot to spend a leisurely afternoon with botanical field guide in hand.

Just a mile downstream is the Trout Lily Trail. Located in the Palisades West Unit on the Cobb County side of the river, this trail offers one of the finest displays of trout lily to be found anywhere. Also in this unit is the Paces Mill Loop Trail. Among the many plants found along this two mile trail is the April blooming phacelia, *P. bipinnatifida,* and yellow lady slipper, *Cyripedium calceolus* var. *pubescens.* The west palisades is a botanical treasure trove. More adventurous souls can explore the rugged riveredge trail along Thornton Cliffs and find mountain spleenwort, *Asplenium montanum,* and lobed spleenwort, *Asplenium pinnatifidum.*

March through October the Chattahoochee River National Recreation Area's fields and forests offer botanical beauty to delight even the most casual observer's eye. Perhaps you would like to walk along a Ranger-guided spring tour. (Trail maps and guided walks' schedules can be obtained by calling the park at 394-8335.) Every year you are invited to enjoy a spring wildflower pilgrimage along the Chattahoochee River.

Botany Is Where You Find It

(Continued from Inside Front Cover)

ly? It surely would not be mistaken for Sosebee's Cove, but there are the purple spires of Venus' looking glass (*Specularia perfoliata*) complementing the tiny yellow blossoms of creeping primrose and some lovely specimens of the native plantain (*Plantago major* L.). They hold their blooming spikes up high which they seldom get to do in any well-behaved lawn. Yellow clover (*Trifolium procumbens*) offers nectar for urban bees.

Will these lovelies be here to catch the eye tomorrow? The life of the urban plant is as unpredictable as that of its country cousin. But, as the breeze blows, they sing the theme song of downtown wildflowers and hope for the best:

"The less they mow,
The more we grow."

Byliners

Artists

Margery Borom, an Atlanta resident, is an art graduate of Pratt Institute. Retired from the Centers for Disease Control art staff after 22 years of producing scientific illustrations, she now combines her hobbies of photography with world travelling.

Bill Close studied at The Corcoran Gallery School of Art, Washington, D.C., and was Advertising Art Director for Rhodes, Inc., for 27 years.

Vicky Holifield has recently done illustrations for the "Panola Mountain Wildflower Guide" and for the Georgia Natural Heritage Inventory Program.

Authors

Jerry Hightower grew up along the Chattahoochee River and its tributaries. He has been an active volunteer with many organizations including the Georgia Botanical Society, the Chattahoochee Nature Center and the Georgia Wildlife Federation. Jerry is employed by the National Park Service as a naturalist and field Supervisor in the Chattahoochee River National Recreation Area.

Vicky Holifield of Decatur, Georgia, received her BA degree from Hendrix College, Conway, Arkansas, and her MAT from Yale University. She is completing an independent study at Emory University on the sandstone outcrops of the Atlahama Grit.

Dr. Samuel B. Jones, Jr., botanist, writer and popular lecturer, has been Director of the University of Georgia Herbarium since 1979. He was also Director of the University of Georgia's Botanical Garden from 1981 to 1984. Prior to his being with the University of Georgia Botany Department, he was an Assistant Professor at the University of Southern Mississippi.

Marie B. Mellinger is famous for her skill at plant identification in the field and for her knowledge of wild edibles and ways of preparing them for the table. She is also compiler of the Botanical Society's "Atlas of the Vascular Plants of Georgia."

Louise M. Morgan, a native of East Tennessee, has lived in Macon since 1957. She is a Phi Beta Kappa graduate of the University of North Carolina at Greensboro who received her MS in Biology from Emory University. A teacher in Mercer's Biology Department for 18 years, she now is Membership Development Director with the Girl Scouts.

A.M. Oshlag, M.D., has recently retired from the practice of medicine in Griffin, Georgia. He has taken many world-wide nature trips. Many of these trips were involved in the collection of orchids and bromeliads.

L. Scott Ranger of Marietta, Georgia, is the Program Vice President of the Georgia Botanical Society and an active naturalist. With a forestry degree, he has a special interest in trees.

Helen C. Stacey earned a BA in both art and journalism at Agnes Scott College, preparing her for her career with Georgia Power Company in Corporate Communications producing exhibits. She has a deep-rooted love of gardening including creating habitats for use of native plants, and thrills to discovering plants in the wild.

Addenda

One year when Steve Bowling was teaching botany to a class of women, the ladies realized after several weeks that he still had not learned their names. When asked how he could remember the names of hundreds and hundreds of plants but could not learn the ladies' names, Steve replied, "But I'm allowed to *touch* the *plants*!"

—Vivian Emerson

When it was suggested that Kanji be used to head the Chinese vicariads listed in the Fall 1988 issue of *Tipularia* ("It All Fits Together," p. 6), Bill Close, the Production Artist, went to his friend Cam Vuong, proprietor of the Motophoto shop in Decatur, Georgia, to have him draw the Oriental characters for us. But everything published must first be proofed. Bill solved that problem by taking the headings to his favorite Chinese restaurant, the Yen Ching, and having one of its people read the headings back to him. Result: *picture perfect* translations.

QK
1.56
V 4
no 1

Tipularia

A BOTANICAL MAGAZINE

Published by the Georgia Botanical Society Fall 1989

LIBRARY
DEC 18 1989
NEW YORK
BOTANICAL GARDEN

IN THIS ISSUE

The Courage of the Wildflowers/2
New Jersey Tea and Relatives/10
Leonard Foote Remembered/14
Trilliums—True Natives/20

Byliners

Artists

Margery Borom, frequent contributor to *Tipularia,* has now joined its staff. She is a retired scientific illustrator, but in addition to the meticulous line drawings she produces for this magazine, her works are done in many mediums and with great versatility of style.

Carol L. Gubbins Hahn received her training in art at the University of Wisconsin, also holding a position there as a scientific illustrator. Now a free lance illustrator in Athens, she was Art Office manager and illustrator for Scripps Clinic and Research Foundation, LaJolla, California.

Dolly J. Harbin attended Miller High School in Macon and is currently Vice-President of South Atlanta Kilns, Inc., Union City. A former wife of author R. L. Harbin, she now resides near Tyrone, Georgia. Her hobbies include drawing and painting, plus art collecting.

Vicky Holifield, a writer as well as artist (see Vol. 4, No. 1, 1989, page 2), joins the permanent staff of *Tipularia* with this issue.

Authors

Helen D. Brown, Associate Professor of Biology at Clayton State College, earned her Ph.D. at the University of Florida. She has taught botany in junior high schools in Florida, England and North Carolina. Helen was president of the Georgia Botanical Society in 1979-81 following other offices held in the Society. Among numerous honors was a 1974 U.S. Energy Department grant to attend an Institute on Radiation and Atomic Energy, University of Kansas.

Nancy C. Coile, a previous contributor to *Tipularia,* was awarded her Ph.D. in botany June 1989 at the University of Georgia, Athens, along with her son and son-in-law who were receiving their B.B.A. degrees. Nancy, formerly Curator of the Herbarium at the University of Georgia, moved this fall to the North Georgia College campus as Assistant Professor of Biology, teaching botany and managing the recently built greenhouse.

John F. Garst received his B.S. in chemistry at Mississippi State College in 1954 and his Ph.D. in physical-organic chemistry at Iowa State College in 1957. He is currently Professor of Chemistry at the University of Georgia, Athens.

John Gorecki, a previous contributor to *Tipularia,* teaches English at Darton College in Albany, Georgia, and holds degrees from St. John's College, Annapolis, Maryland; Oklahoma State University, and the University of South Carolina. His special interests range from fiction and nature writing to classical Greek, philosophy, and wild plants and birds.

Raymond L. Harbin's formal education was in theology and related ancient languages. His informal studies were in climate and meteorology and thermodynamics of biomass gas generation. His empirical education is in ecological studies of the eastern deciduous forest—including forest studies in every state east of central Kansas. He is President of South Atlanta Kilns, Inc., and Vice President of Richmond Lumber Co., Inc., both in Union City, Georgia.

Marie M. Mellinger has held the presidency of the Georgia Botanical Society through two terms: 1971-72 and 1983-84. Among other clubs over which she has presided are Friends of the Mountains in 1986 and the Wild Edibles from 1977 to the present.

Donald W. Pfitzer received his formal training in entomology at the University of Tennessee followed by service on the faculty as an instructor in medical and economic entomology. He retired from the U.S. Fish and Wildlife Service as Assistant Regional Director for the Southeast Region. A charter member of the Georgia Conservancy, he has been associated with many other conservation and environmental organizations. Don has produced 13 wildlife movies and published many articles on wildlife photography and writing.

L. Scott Ranger joins the staff of *Tipularia* this issue as head of the Book Report department.

Vol. 4, No. 2 **Tipularia** **Fall 1989**

2 A Question of Survival *By Raymond L. Harbin*
A look at elevation and climate *Illustrated by Dolly Harbin*
9 Wild Edibles — Teas *By Marie B. Mellinger*
Let's drink to our health and pleasure *Illustrated by Vicky Holifield*
10 Seven Species of Deciduous *Ceanothus (Rhamnaceae)* *by Nancy Coile*
Southeastern and Western plants examined
Illustrated by Carol L. Gubbins Hahn
14 Leonard Ensign Foote (November 2, 1918 - May 9, 1989)
By Donald W. Pfitzer
20 Those "Funny" Trilliums on Rabun Bald *By John Garst*
A meditation on trilliums and species
26 The *Hypericum* Bog *By Marie Mellinger*
A mini-habitat

Inside Front Cover **Byliners**

17 Book Report *By L. Scott Ranger*
18 Site-Seeing *By John Gorecki*
24 First Person Singular *By Helen D. Brown*
26 Fielding Your Questions *T. S. Patrick*

Front Cover Turk's-cap Lily *(Lilium superbum)* is thriving on a hillside in southern Metropolitan Atlanta. This and other sensational wildflowers appear naturally on Ray Harbin's property, and he wonders in his article, "How can these things be?" See page two. *Illustration by Margery Borom.*

Board of Editors Vernon Bates, David L. Emory, Marie B. Mellinger, Thomas S. Patrick, Harriett L. Whipple

Executive Editor Anna Belle Close

Business Manager Sally Emory

Staff Betty Devon, Charles Devon, Ruby Gill, Robert H. Gill, Eleanor Lehner, Frank Lehner, L. Scott Ranger, Gail Russell, Helen Stacey

Consultants Stephen M. Bowling and Harriett DiGioia

Production Bill Close, production artist and camera work; Office Graphics, Inc., typesetting; Gwinnett Printing Co., Inc., printer.

Tipularia is published at intervals by the Georgia Botanical Society to foster knowledge of and interest in the state's native plants and related subjects. Membership in the Society is open to all persons interested in the botany of Georgia. Annual dues: individual or family, $15; group, $20; student, $5. Other membership categories: contributing, $25; donor, $100; patron, $1,000. Send mailing address and check made payable to the Georgia Botanical Society to: Suzanne S. Jackson, 3461 Ashwood Lane, Chamblee, Georgia 30341.

Members of the Society receive *Tipularia* without extra charge. Others may receive the magazine by becoming *Tipularia* associates for $7 a year. To become an associate, send mailing address and check made payable to the Georgia Botanical Society to: Sally Emory, Business Manager, *Tipularia,* 7575 Rico Road, Palmetto, Georgia 30268. With the Exception of Vol. 1, No. 1, single copies are available in limited quantities from the same address for $4 each.

Editorial Information: The Georgia Botanical Society's goal for *Tipularia* is to combine the scientific authority of a botanical journal with the readability of a magazine. Some articles are assigned, but other manuscripts are welcome. *Tipularia* is not able to pay for articles (or illustrations), but there is no charge for publication. Send all manuscripts and editorial inquiries to: Anna Belle Close, Executive Editor, *Tipularia,* 225 Forkner Drive, Decatur, Georgia 30030. A copy of our "Guidelines for Authors" is available from the same address on request.

Copyright 1989 by the Georgia Botanical Society.
Postage paid at Decatur, Georgia. Send address changes to: Sally Emory, Business Manager, *Tipularia,* 7575 Rico Road, Palmetto, Georgia 30268.

A Question Of Survival

A look at elevation and climate

By Raymond L. Harbin

Illustrated by Dolly J. Harbin

WHEN ONE ENCOUNTERS THE UNUSUAL, he or she often expresses the surprise in the interrogative: How can these things be? The inquisitive theme is endless in the classical literature. This haunting question can be seen from such diverse ancient scrolls as the Old Testament, Plutarch, Tacitus and St. Augustine; through the dusty, embrittled pages of Galileo, Pascal, Liebig, Kelvin, Planck, Bohr and Einstein; continuing to the current hour in slick, glossy journals dealing with such weighty questions as "ozone holes" and "fusion-in-a-jar." The reader will, no doubt, take comfort by the statement that this article does not deal with questions pertaining to any of the above. (Well, maybe a smidgen of Liebig and Kelvin.)

Samuel Butler (no relation to Rhett) is credited with observing: "It has been said that although God cannot alter the past, historians can; it is perhaps because they can be useful to Him in this respect that He tolerates their existence." This writer cannot say whether or not he wholeheartedly endorses Butler's sly dictum. He can say, however, that in reading histories and biographies, it is the *questions posed,* rather than statements made, which most profoundly arrested the attention of this present writer. When Max Planck began to ask questions about classical mechanics (Newtonian), the midwives of the atomic age began to gather around.

When David Emory, Steve Bowling and Tom Patrick, *et al.,* start scratching their credentialed heads at the profusion of nodding trillium *(Trillium rugelii),* Canadian ginger *(Asarum canadense),* yellow lady's slipper *(Cypripedium calceolus),* Turk's-cap lily *(Lilium superbum),* etc., dwelling in certain southwest Fulton County sites; the question naturally arises: How can these things be (here)?

In this brief article we will attempt to indicate through ecological tools (the best tools for work in a natural regime), just why these northern or montane plants seem so delightfully content to dwell in southwest Fulton County. It seems appropriate at this time to define what forest ecology is and also to list a few of its tools.

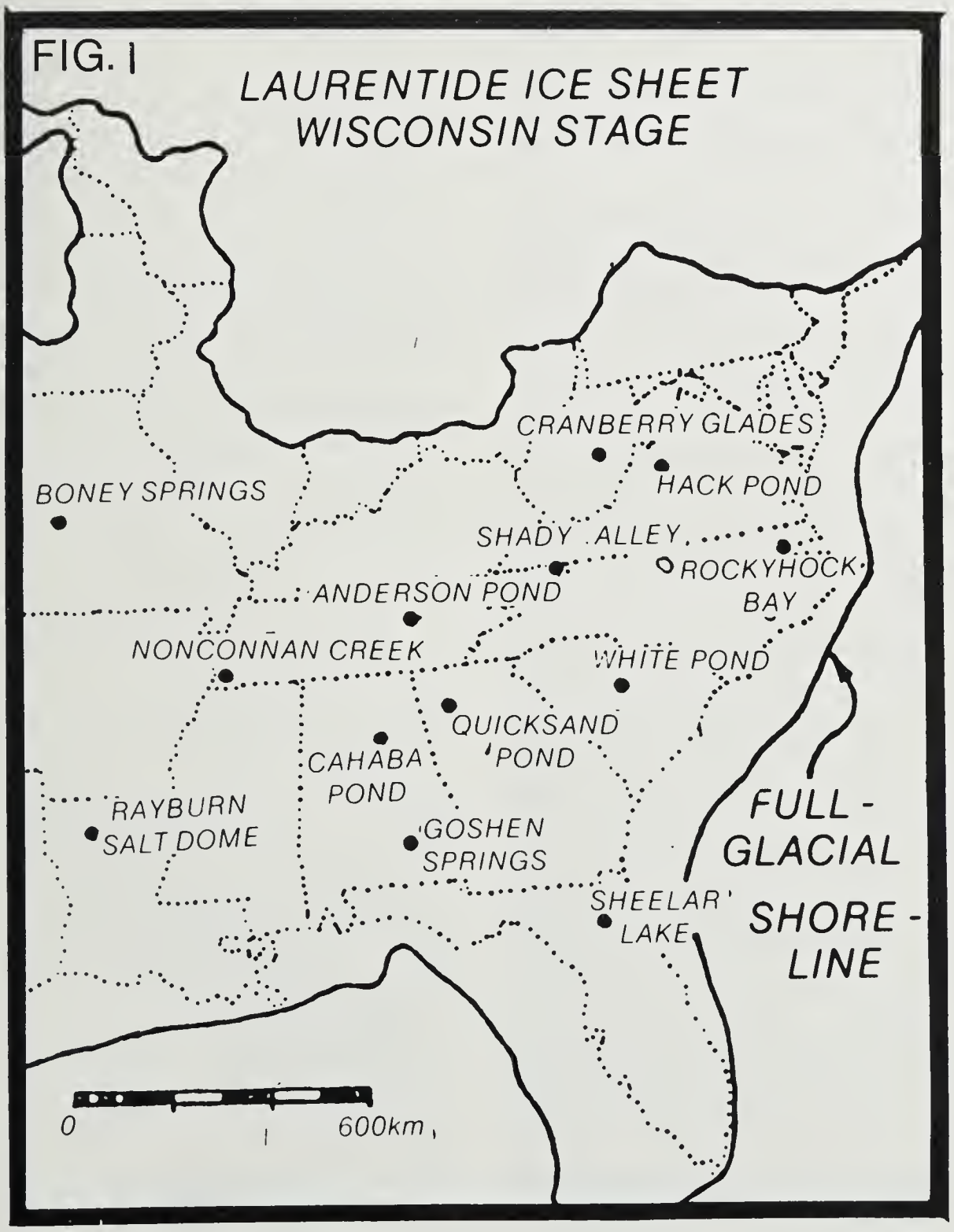
The term *ecology* is derived from two classical Greek words *oikos* and *logia.* They translate with perfect ease into our native tongue as "a discourse on (or study in) a *dwelling place.*" The term was first employed by the German zoologist Ernst Haeckel around 1867. Since the Germans were sticklers for linguistic detail, *oekologie* was his native translation, and "relationship of the animal both to its organic as well as inorganic environment" was his (zoological) definition. In the interest of verbal economy, it is necessary to leap forward to about 1965 to define modern forest ecology as it is used in this paper: "the study of plants and animals as they interrelate in their whole environment."

We will use several "components" (tools) of ecology. The first will, of necessity, be paleoclimatology (Gr. older climate). If we are to believe that many of the previously listed plants are "northern" in origin, then we must account for their occurrence in southwest Fulton County. Put somewhat differently, we must invoke

(Steve) Bowling's First Law of Phytogeography: "In order for a plant to occur in a given locality, it has to have gotten there in the first place." Paleoclimatologists are quick to provide an "event" which began about 100,000 years-before-the-present (YBP) and *began* ending about 18,000 YBP, which would send all northern lifeforms scurrying southward. This event is called the Wisconsin stage of the Pleistocene Ice Epoch. The glacial surge terminated along an irregular line (fig. 1) beginning at present-day Long Island, N.Y., stretching westward toward St. Louis, without actually entering Missouri. Numerous members of the current flora of central Ontario were then the flora of metro Atlanta.

Palynologists (Gr. those who study pollen) have uncovered "proxy evidence" in acid-bog digs just above Cartersville (the Quicksand Pond in Fig. 1) — which confirms Jack pine *(Pinus banksiana)* to have been a major element of local forests 16,000 YBP. Today, although the dry, sandy soils of northern Michigan contain substantial Jack pine stands, the climate and other ecological factors of most of New England are too mild for the species to compete effectively. This fact should serve to indicate just how cold were the winds that blew across Peachtree Street 16,000 YBP.

By 8,000 YBP the Wisconsin glacial front had receded into Canada. It had taken 10,000 years to move a mere four

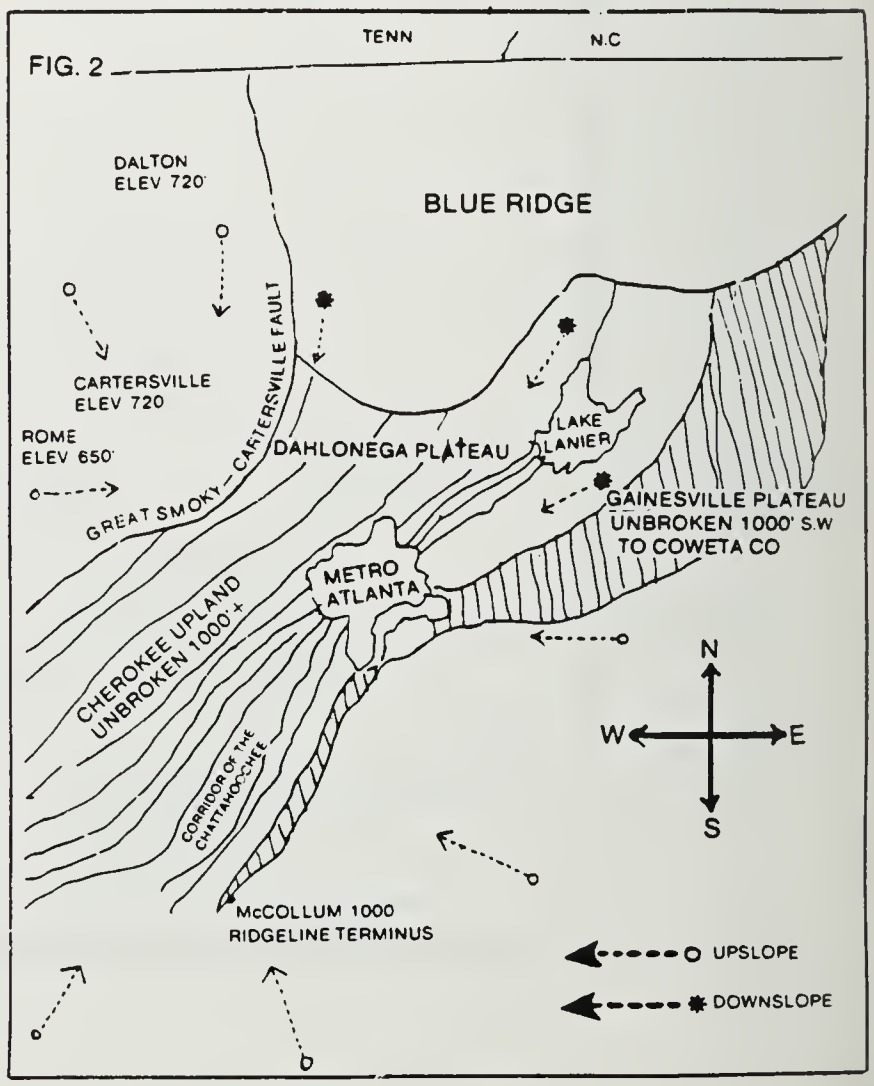


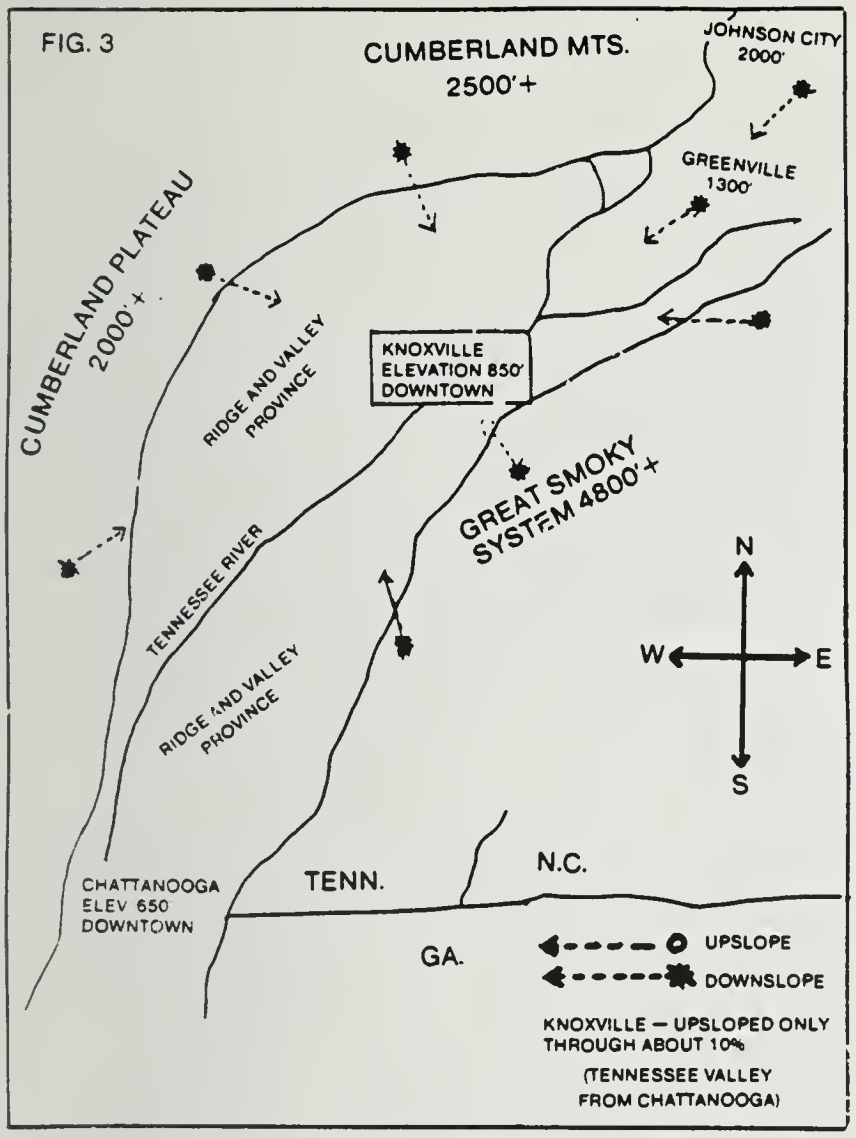
to five hundred miles north as it paused and vacillated from time to time. It began to hurry back home (to Greenland, where it now resides) about 8,000 YBP due to the influence of a little-understood but much-named time segment called the Altithermal, the Hypsithermal, the Megathermal or the Xerothermic period. The reader may take his pick among names for this Holocene episode of some 3,000 years duration, as they all are constructed to suggest "hot and dry." Many authorities attempt to quantify "hot and dry" at four to eight degrees Fahrenheit above present annual mean and perhaps fifty to seventy percent of current annual rainfall. While many experts indicate that proxy evidence for this interval does not support the hot and dry scenario for the region north of latitude forty-five (northern Maine and northern Michigan), the term *Xerothermic* (my choice) was most clearly appropriate for most of the country.

A most obvious and troublesome question now arises: How could a northern flora survive in southwest Fulton County under such severe climatic conditions? How could these things be? The answers are: (1) They didn't. They survived in the mountain coves where the temperatures were ameliorated by increased altitude and where moisture was augmented by orographic (mountain induced) precipitation. This assumption further suggests a movement from their Xerothermic refugium to better sites on the inner piedmont during the past 5,000 years; during which time, climatic conditions very much like the present have reigned. Or (2) at 8,000 YBP the entire Georgia Piedmont was lush with northern wildflowers which were destined to die out during the hot-dry Xerothermic climate interval, except those lucky enough to be in suitable *microclimes.*

Before we deal with microclimes, let us take a brief view of metro Atlanta's macroclimate record, as it surprises many to note the city's mean July daily high is 2.5 degrees F. cooler than Memphis's; 2 degrees cooler than Nashville's; 1.2 degrees cooler than St. Louis's and one degree cooler than Chattanooga's. (The list could go on, but this paper cannot.) In fact, the thirty-year (1951-1980) National Oceanic and Atmospheric Administration's record for the daily, July maximum for Atlanta is identical to that of the "mountain" town of Knoxville: 87.5 degrees F.

Although local elevational differences account for a small amount of these "reversals of the norm," they cannot account for the fact that Atlanta and Knoxville can expect to see the same average temperature during July afternoons. The central sector of Atlanta is only 200 feet higher than that of downtown Knoxville, not nearly enough to counter the loss of almost three degrees of latitude. The law of physics which deals with temperature reduction due to elevational increase is called the "atmospheric lapse rate." This ALR is important, albeit difficult to quantify locally, especially when dealing with elevational differences of only 200 feet. Of greater importance in understanding the Atlanta-Knoxville "paradox" is the law of physics called the "adiabatic lapse rate." (Please see the regional, physiographical contrast between figures 2 and 3.) This thermodynamic principle simply





says (for the purposes of this paper) that air flowing *upslope* cools at a constant rate (5.5 degrees per 1,000 feet elevational increase in *dry* air); conversely a parcel of air warms up at the same rate when it flows downslope to a given locale. Note, please, the mapping in figure 2. Winds arriving on metro Atlanta's local, 1,000 foot, *unbroken* ridgelines tend to cool the city *adiabatically* through about 80% of the compass. Conversely, Knoxville tends to be warmed by being *downsloped* by arriving winds through about 90% of the compass.

A theoretical example of these adiabatic processes at work would have a parcel of air (a *dry* summer wind) moving from Augusta (elevation 200 feet) west-northwestwardly to the eastern ridge of Atlanta (elevation 1,000+, i.e., 800′ higher). If we use 90 degrees for the air as it passed over Augusta, the same air mass would *lose* (800/1000 x 5.5 =) 4.4 degrees F. This would result in the *same parcel* of moving air reading 85.6 degrees in Atlanta. In actuality, the temperature losses resulting from the *dry adiabatic lapse rate* would be moderated by moisture, which is *invariably* present in our climate. The *moist* adiabatic lapse rate is very complex, and, since it varies in value with atmospheric humidity, it will not be dealt with here. It is safe to say that sheer elevation, elevation relative to surroundings, higher evaporation rates associated with higher terrain (wind exposure) and transpiration from flanking forests (especially deciduous), *all* contribute to relatively mild Atlanta summer days.

A few years back, the writer left his office earlier than normal. The occasion for this unusual (and pleasant) late June foray, resulted from having heard the four p.m. NOAA radio announce a current 98 degree, 48% relative humidity (RH) condition. Hurrying home, some three miles (the crow route) and 100 feet lower elevation, I speculated that this might be the hottest day of the year, since the barometer was approaching 30.30″, reinforcing the cloudlessness of the milky-blue sky. For just such an event, I had previously set up an Omega model 650, 120 volt thermocouple console (a high-resolution, electronic thermometer) and had earlier strung wiring into the lush "covelet" behind my home for the purpose of remotely sensing temperature in this luxuriously vegetated *microclime.*

At five p.m. the writer carefully gazed at the digital console and recorded the temperature at two feet above ground elevation and also at five feet (official height). The readings, which came from separate probes spaced twenty-five feet apart, were identical. Immediately leaving my elevated rear patio, I hurried down into the shaded hollow, spinning a Princo sling psychrometer (a device for computing relative humidity) above my head. Birds flushing from the understory squeaked and chirped, and a startled and angry gray squirrel chided my hasty entry from the safety of his perch fifty feet up on the limb of a mockernut hickory. While spinning the psychrometer for about 90 seconds, my eyes surveyed the perfectly contented ginseng and the still-flowering, snowy raceme of tall black cohosh plants. At the base of the steep, fifty-foot slope, glistening fruit of yellow mandarin sparkled in contrast to the dark green background.

After carefully noting the wetbulb reading, I began to calculate the relative humidity as I walked back up the steep slope to wait for the five p.m. NOAA summary. The reasons for my sticky shirt and clammy brow began mathematically to unfold on the pad in my hand.

At five-eighteen the squawky weather radio detailed the upper line; the lower values are those of the covelet:

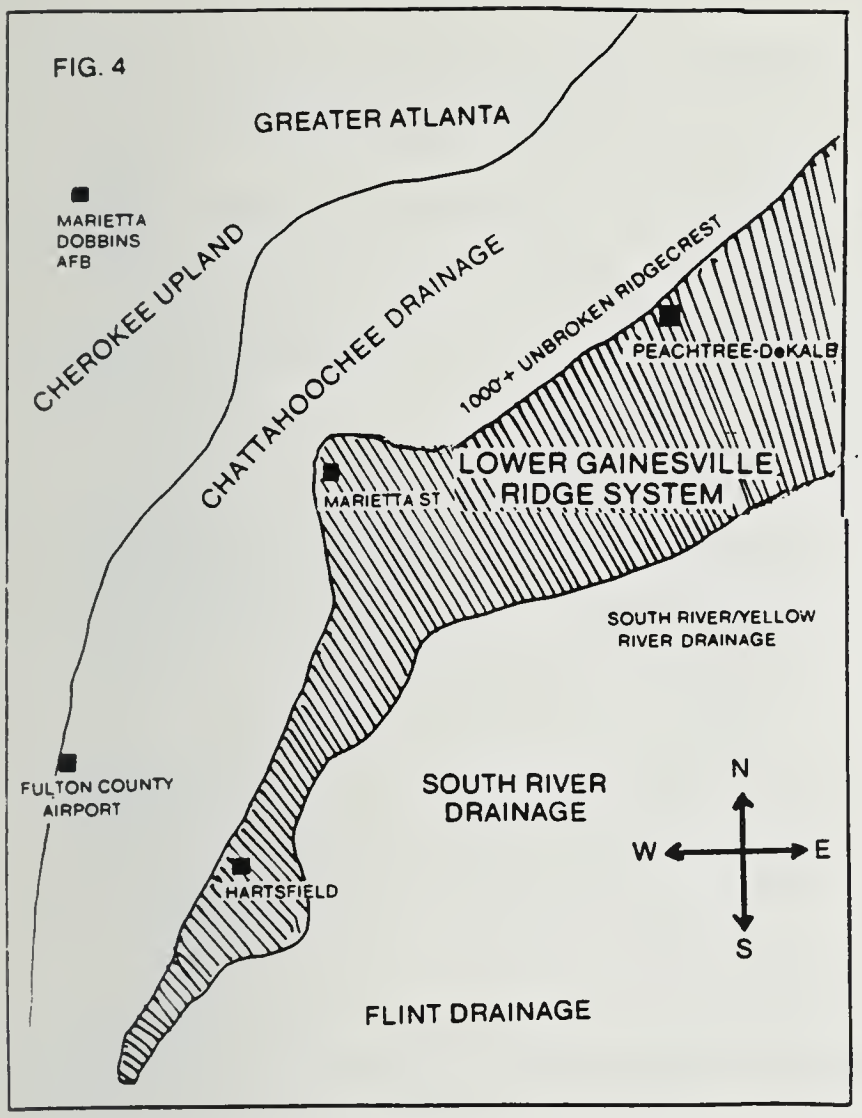
Temp.: 99 degrees;	RH: 51%;
Wind: WNW 8-10 MPH;	Bar.: 30.30″
Temp.: 82 degrees;	RH: 91%;
Wind: none discernable;	Bar.: NA

How can these things be? Seventeen degrees cooler than Hartsfield Airport and seven air-miles southwest of the official station? Several factors should be noted: (1) The data for Hartsfield are collected between two concrete runways in the center of an area that is *treeless* for thousands of feet in any direction. (2) The data for the lower line were taken from a *north-facing slope* of a deciduous forest with a maturing canopy, dominated by yellow poplar, northern red oak, white oak, mockernut hickory and basswood. (3) While the *macroclimate* was attempting to heat the covelet to (or near) the level of Hartsfield, the local environment was thwarting the attempt by converting the drybulb potential (i.e., 99 degrees F.) into a much lower value (82 degrees F.). Although solar aspect was an aid in local cooling, the process used to ameliorate the danger inherent in the dry bulb potential was *evapotranspiration* from the lush canopy and understory vegetation. Put somewhat differently, the northern to montane wildflowers (the ginseng, yellow mandarin, black cohosh, etc., of the local slope) were able to use the enormous root network and vascular transport system of the trees of its *habitat,* to fend off harmful or even lethal temperatures.

Note also the very high relative humidity of the covelet, which was 40% higher than the value at Hartsfield. This figure is the key to understanding the 17 degree temperature differential, since meteorologists recognize that all vaporizing processes are *endothermic* processes (that is, they *require heat*). In this instance, the evapotranspiration pulled sensible heat from the atmosphere and stored it as latent (unsensible) heat in the water vapor (humidity) of the covelet. This process, while perhaps confusing to some readers, is, in fact, quite simply demonstrated by licking the back of one's hand (assuming it is clean) and blowing on the moist spot. The moist spot is cooled by the vaporization of saliva. It is noteworthy that at 100% relative humidity, licking and blowing the back of one's hand will not cool the moist spot, since *no evaporation* will occur in an atmosphere that is saturated. The sling psychrometer mentioned above uses this principle in determining the wetbulb temperature which is used to compute the relative humidity. This device is, however, subject to greater accuracy than licking and blowing one's hand (and with the added advantage of increased hygiene).

Before we leave the subject of local and regional climate, it is important to note that the behavior of air at *night* (like some of us) is often different from that of the daylight hours. This difference in behavior results from winds generated during daylight hours by the dynamics of sunlight differentially heating the surface of the earth and the adjacent atmosphere. This effect can be most dramatically seen when the barometer is steady and the sky is clear. Figure 4 represents a greatly simplified physiographic depiction of the metro Atlanta area. The following legend details the significance of points one through five:

1) College Park (Hartsfield)
   . . . elevation 1020′ Temp. 50° F.
2) Chamblee (Peachtree-DeKalb Airport)
   . . . elevation 1010′ Temp. 49° F.
3) Marietta (Dobbins AFB)
   . . . elevation 1060′ Temp. 48° F.
4) Mableton (Fulton County Airport)
   . . . elevation 840′ Temp. 43° F.
5) Downtown (Marietta Street)
   . . . elevation 1050′ Temp. 57° F.

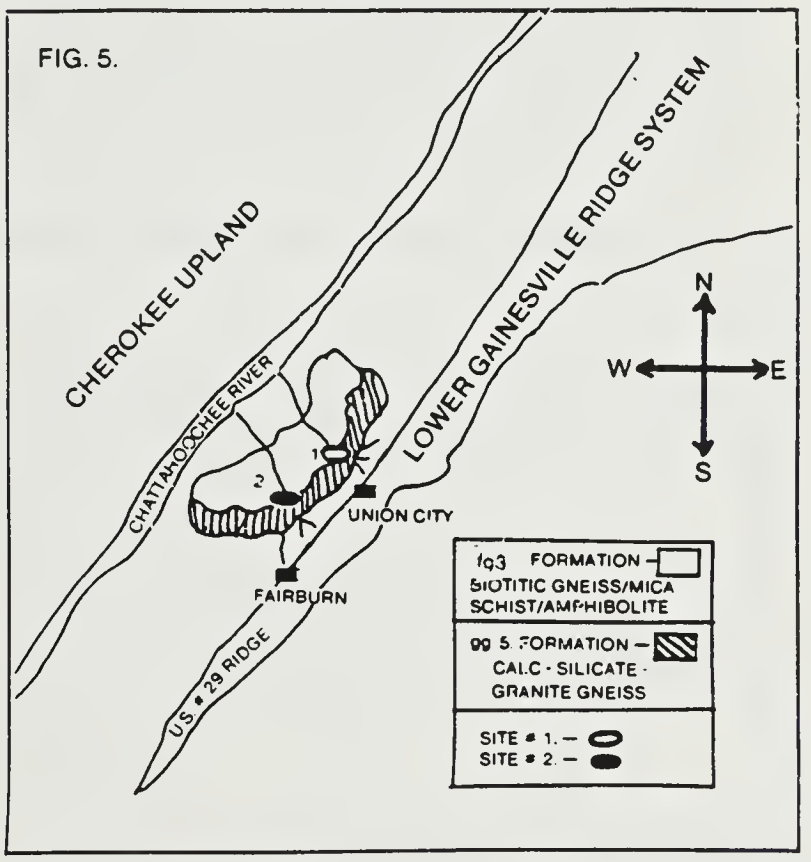


These data are those actually observed for Saturday a.m., May 6, 1989. (One week after the southwest Fulton County fieldtrip taken by the Bot-Soc members.) Notice the lowest temperature recorded is that of Fulton County Airport (Charlie Brown to some). This observed "anomaly" is not unusual; rather it is the rule for clear, still nights. It is caused by upward movement of warmer air and cool air drainage to lower points of local and regional physiography. Cool air is heavier than warm air; it, therefore, will move under warm air displacing it upward. It is not unusual for the first frost to occur twenty to twenty-eight days earlier at the lower elevation of Fulton County Airport versus that of Hartsfield.

The significance of the above relates to the fact that most of the sites where northern or montane plants are found in southwest Fulton County fall within the range of 800′ to 900′ of local elevation; these are usually in association with local north-facing hill or ridge systems that approach or exceed 1000′.

While local macroclimate and its associated microclimes are important in understanding "how can these things be," climate factors are of no greater importance than geology and the resultant soil minerals associated with the two sites.

Please refer to figure 5 and notice the sites denoted by the numbers, 1 and 2. Site one is the "Trillium Terrace," of the morning field trip (adjacent to Red Mill Creek). Site two is "Cypripedium Slope" (adjacent to Line Creek), the host area for the afternoon field trip. It is quite significant that both of these creeks rise from the springheads near U.S. Highway 29 and flow northwestward, cutting through a geological formation (shaded area of figure 5), which is identified on the Geological Map of Georgia as "gg5."



This gg5 code designates calc-silicate granite gneiss. Again, refer to figure 5 and see that this formation abuts and apparently overthrusts a formation (unshaded) which is coded "fg3." Fg3 decodes as biotitic gneiss/mica schist/amphibolite. It is unimportant (fortunately) whether or not the reader should remember any of the above geological intricacies. The important thing to note is that most of these metamorphic rocks break down into soils rich in mineral bases. The mineral *bases* are rich in calcium, magnesium, potassium and sodium; soils that are rich in bases are referred to by soil scientists as *high base status* soils.

Another name for calc-silicate (the gg5 code) formation is "lime-silicate." Further, biotite (the fg3 formation) is generally rich in both potassium and magnesium. Amphibolite, although somewhat variable in precise mineral composition, is usually high in both magnesium and calcium. The importance of basic minerals in natural regimes cannot be overemphasized, especially for many of the locally rare plants seen on Sites One and Two. Not only are calcium, magnesium and potassium part of the *macronutrient* group of elements (those elements needed by plants in relatively large amounts for natural competition), they also produce a less-than-normally acidic to circumneutral soil regime that is extremely important to many plants that we find growing "out of their normal range."

It is also very significant that as the streams of Sites One and Two gnaw through the geological formations, they produce "gorges," deep within the formations which keep the locally rare wildflowers in very close and abiding contact with the basic minerals so necessary for their continued survival.

We have looked at a few of the ecological principles providing partial answers to the question: "How can these things be (here)?" We end this treatise with the most difficult question of all:

How can we keep them here?

The Author wishes to thank the U.S. Park Service, Uplands Field Research Laboratory, GSMNP Gatlinburg, for Fig. 1; Dolly J. Harbin for Figs. 2 to 5; National Climatic Data Center, Asheville, for climate data.

Partial List of Plants Seen at Site 1, Red Mill Creek

"Trillium Terrace"

Blue Phlox - *Phlox divaricata*
Nodding Trillium - *Trillium rugelii*
Wood Betony - *Pedicularis canadensis*
Wild Ginger - *Asarum canadense*
Wild Comfrey - *Cynoglossum virginianum*
Black Cohosh - *Cimicifuga racemosa*
Ginseng - *Panax quinquefolium*
Schisandra - *Schisandra glabra*
Green Dragon - *Arisaema dracontium*
Turk's-Cap Lily - *Lilium superbum*
Atamasco Lily - *Zephyranthes atamasco*
Sweet Chervil - *Osmorhiza longistylis*
Doll's Eyes - *Actaea pachypoda*
Umbrella Magnolia - *Magnolia tripetala*
Strawberry Bush - *Euonymus atropurpureus*
Adder's-Tongue Fern - *Ophioglossum pycnostichum*
Silver Glade Fern - *Athyrium thelypterioides*

Partial List of Plants Seen at Site 2, Line Creek

"Cypripedium Slope"

Most of those seen at Site 1, but additionally:
Yellow Mandarin - *Disporum lanuginosum*
Bellwort - *Uvularia perfoliata*
Nodding Pink Trillium - *Trillium catesbaei*
Crested Iris - *Iris cristata*
Monk's Hood - *Aconitum uncinatum*
Figwort - *Scrophularia marilandica*
Green Violet - *Hybanthus concolor*
Richweed - *Collinsonia canadensis*
Yellow Lady Slipper Orchid - *Cypripedium calceolus*

Trees of the Text

Northern Red Oak - *Quercus rubra*
White Oak - *Quercus alba*
Mockernut Hickory - *Carya tomentosa*
Yellow Poplar, Tulip Tree - *Liriodendron tulipifera*
Basswood - *Tilia heterophylla*

Wild Edibles

Teas *Let's drink to our health and pleasure*

By Marie Mellinger*

Illustrated by Vicky Holifield

IT WOULD BE SAFE to say that the majority of Bot Soc members who attend the field trips have been served one or more of Marie Mellinger's teas brewed from the wildflower world. A first step, of course, is identifying the "ingredient plant." Unless you are quite familiar with the plant you are looking for, gather your tea-making plant under the watchful eye of an expert in the field. This is certainly true in all cases of wild food gathering. As you become more familiar with the wildflowers, it is still a good idea to search with a field guide in hand that has good written descriptions and/or approved identifying pictures.

—The Editor

Solidago odora

*Permission has been given by Marie Mellinger for the above material to be adapted from *Living off the Land.*

The recipe is informal but time tested: Whether it calls for the flowers, stems or roots of the plant, all these teas are made by simply putting the one to be used in a jar of water and setting it in the sun to steep.

From Canada to South Florida, the woods and fields are host to many wild plants, shrubs and trees which can provide free and good-tasting herbal teas.

Sassafras, for example, is a common weed/tree, appearing in early stages of succession in old fields, or cut-over forests, and persisting into 40- to 50-foot trees in mature forests. We are warned that sassafras does contain a possibly dangerous substance called *saffrole,* so use in moderation. Don't drink a gallon in one sitting!

Spicebush *(Lindera benzoin)* grows along streams and in deeply shaded ravines. The aromatic twigs make a pleasant tonic tea. Later the red berries are used as spice. Easily identified by taste and odor, the spicebush will readily give us handfuls of spicey twigs.

Northern basswood *(Tilia americana)* or Southern basswood *(Tilia floridana)* both supply us with fragrant blossoms in midsummer. These make a richly sweet tea, best iced with a little wild mint or lemon balm added.

The elderberry *(Sambucus canadensis)* grows in ditches and damp woodlands. In Florida during mild winters, you can often see the umbel-like blooms year 'round! The white flowers can be used fresh or dried for a very pleasant tea.

New Jersey tea *(Ceanothus americanus),* a common shrub, is found on sandy roadberms, along trails and in dry open woods. Gathered when in bud or bloom, the white flowers and leaves make a pleasant tea without caffeine.

Goldenrod *(Solidago odora)* is the only one of the goldenrod species found in this country which has the anise taste and odor hinting that leaves and flowers make good tea. Use with a light touch and add a sprig of mint or lemon balm.

There are a myriad of plants of woods, fields and gardens from which tasty teas may be brewed: rose petals, hips and leaves; leaves of the following: strawberry, blackberry and raspberry (when very young); yarrow, red clover, violets, Queen-Anne's lace. Sassafras, sweet birch and spicebush are often combined for S.S.S. tonic!

Iced, all are a pleasant addition to a hot summer day.

Seven Species of Deciduous

Southeastern and western plants examined

By Nancy Coile

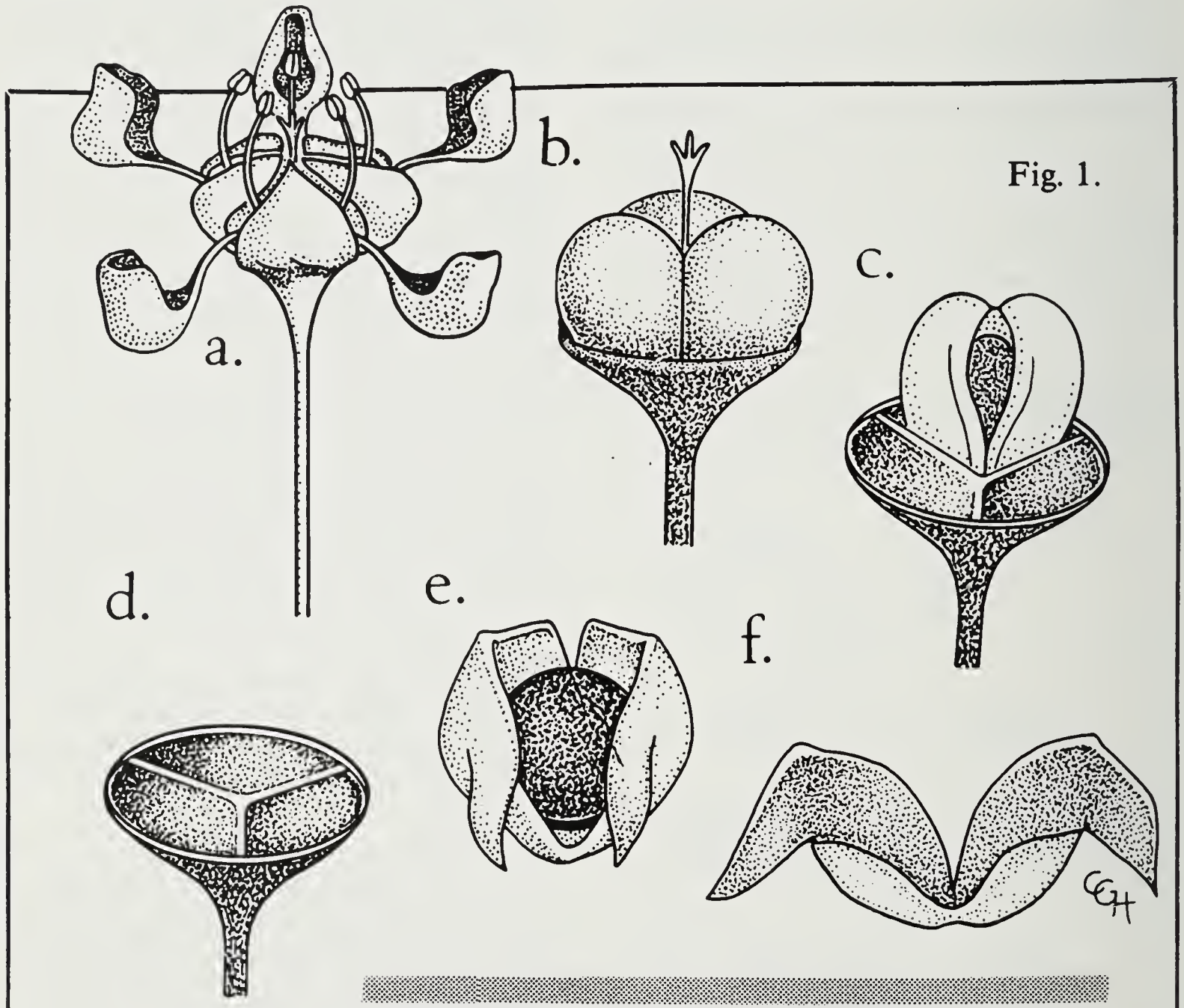


Fig. 1.

Stylized drawing of *Ceanothus* flower, fruit and seed.

a. Flower, with five clawed petals opposite the stamens and five triangular sepals.
b. Three-lobed fruit with persistent style.
c. Fruit with two carpels removed to reveal the remaining endocarp tissue beginning to split. Seed is inside.
d. Empty receptacular disk.
e. A single seed enclosed in the bony endocarp (pyrene) showing the central and two lateral splits.
f. The endocarp fully extended at the stage after it has sprung apart.

Ceanothus (Rhamnaceae)

MOST *Tipularia* READERS are probably familiar with *Ceanothus americanus* and know it also as New Jersey tea. In south Georgia, south Alabama and Florida, there is another species which is not quite as familiar — *Ceanothus microphyllus.* There are five more species included in this discussion, and all seven were studied for dissertation research completed December 1988. Three of these species are east of the Rockies and four are west.

"Redroot" is a common name for these deciduous species of *Ceanothus.* The plants are perennials with large, woody, red-colored underground stems. This rootstock is a marvelous adaptation to fire, since the protected stem resprouts after the above-ground portions have been burned.

All species of *Ceanothus* which have been tested have shown the ability to fix nitrogen. Often *Ceanothus* grows in dry, poor soils, and thus this feature is of great benefit. Mostly the nitrogen is fixed due to a mycorrhizal association with a fungus, and the nodulating *Rhizobium* bacteria are only occasionally involved. In the legumes such as soybeans, *Rhizobium* is the nitrogen-fixing agent.

The genus was established by Linnaeus in 1753. Since that date about 55 to 60 additional species have been described, and most of the species are endemic to California. Sereno Watson, Curator at Harvard in the 1800's and collector in the western U.S., noticed that the species fell into two groups. The group to which *Ceanothus americanus* and *C. microphyllus* belong has alternate leaves, and the fruits are not crested, while the other group has opposite, thick, leathery leaves and horned fruits. The group with opposite leaves has another leaf character which is quite unusual. Rather than having the stomata on the surface of the leaf, these plants have their stomata in pouches or crypts. (Stomata, minute openings in the epidermis, are surrounded by a pair of guard cells and function in gas exchange.) This odd positioning of the stomata reduces the plant's water losses and is considered to be an adaptation to dry, desert-like conditions.

The fruit of *Ceanothus* splits explosively and flings the three small seeds quite a distance from the parent plant. After releasing the seeds, the distinctive disk remains on the plant and is a great identification feature. There is a controversy over the designation of the fruit type, but it is probably wise to follow the idea of Vikhireva (a modern day Russian morphologist) that the cartilaginous tissue which splits and flings out the seeds is a stone or pyrene which encloses the seeds. (See Figure 1b-f.)

Ceanothus is not content with a few oddities: The flower is not a common type either. Each clawed petal is opposite a stamen and wraps around the stamen when in bud (Figure 1a). Think! Which flowers do you know that have petals directly opposite the stamens?

The sepals and pedicels are usually the same color as the petals. These small flowers may be white, blue, pink or lavender and are arranged in small to large inflorescences. These lovely floral displays are prized by European gardeners, but ignored by most Americans. Some of you may have noted the recent Victory Garden program which featured a

Ceanothus plant in pride of place in a New Zealand garden. All species of *Ceanothus* are native to the New World.

If you have been in California in late May or early June, you may remember the showy *Ceanothus integerrimus.* Plants reach 10 feet tall and are covered with masses of either white or blue flowers. This species is very abundant there and obvious to even the casual observer. It is known as "deer brush" because the leaves are relished by browsing animals.

Barely reaching into California, but extending far into British Columbia, is the red-stemmed *Ceanothus sanguineus.* The common and scientific names refer to the blood-red colored stems. It is also highly palatable to mammals and constitutes 60% of elk diet in Idaho. Except for one county in Michigan, red stemmed *Ceanothus* is restricted to areas west of the Rocky Mountains.

At elevations above 5,000 feet and restricted to California is *Ceanothus parvifolius.* The plants are wheel-shaped with branches spreading over the ground. The flowers are an intense blue. Herbarium specimens resemble *C. integerrimus* since both species have leaves with entire margins.

Ceanothus martinii is a rare species which grows in Utah and neighboring states. It is a rounded diffuse shrub with rather small clusters of flowers.

The longleaf pine sandhills of Georgia are prime habitat for *Ceanothus microphyllus.* This species has the distinction of possessing the smallest leaves for woody plants in North America. The usual sized leaf is about 3mm long. The white flowers are arranged in terminal inflorescences.

In the prairie states, both *Ceanothus americanus* and *C. herbaceus* may grow side by side. The early farmers loathed and despised these plants whose roots hampered their plowing efforts. Their common names are not fit for our eyes or ears! *Ceanothus herbaceus* barely extends into the south, with one population in Louisiana, a few sites in the Potomac River valley of Virginia and several counties in Arkansas. It does not extend west of the Rocky Mountains, but is very well represented in Texas. This species is similar to *C. americanus,* but differs by its ovate leaves, leafy peduncles, terminal inflorescences and earlier bloom time.

Ceanothus americanus is found in the prairies of the midwest, in thin woods, and at the edges of woods and roadsides throughout the eastern U.S. and into Canada. It is by no means common, but can be found in large colonies in certain areas. Figure 2.

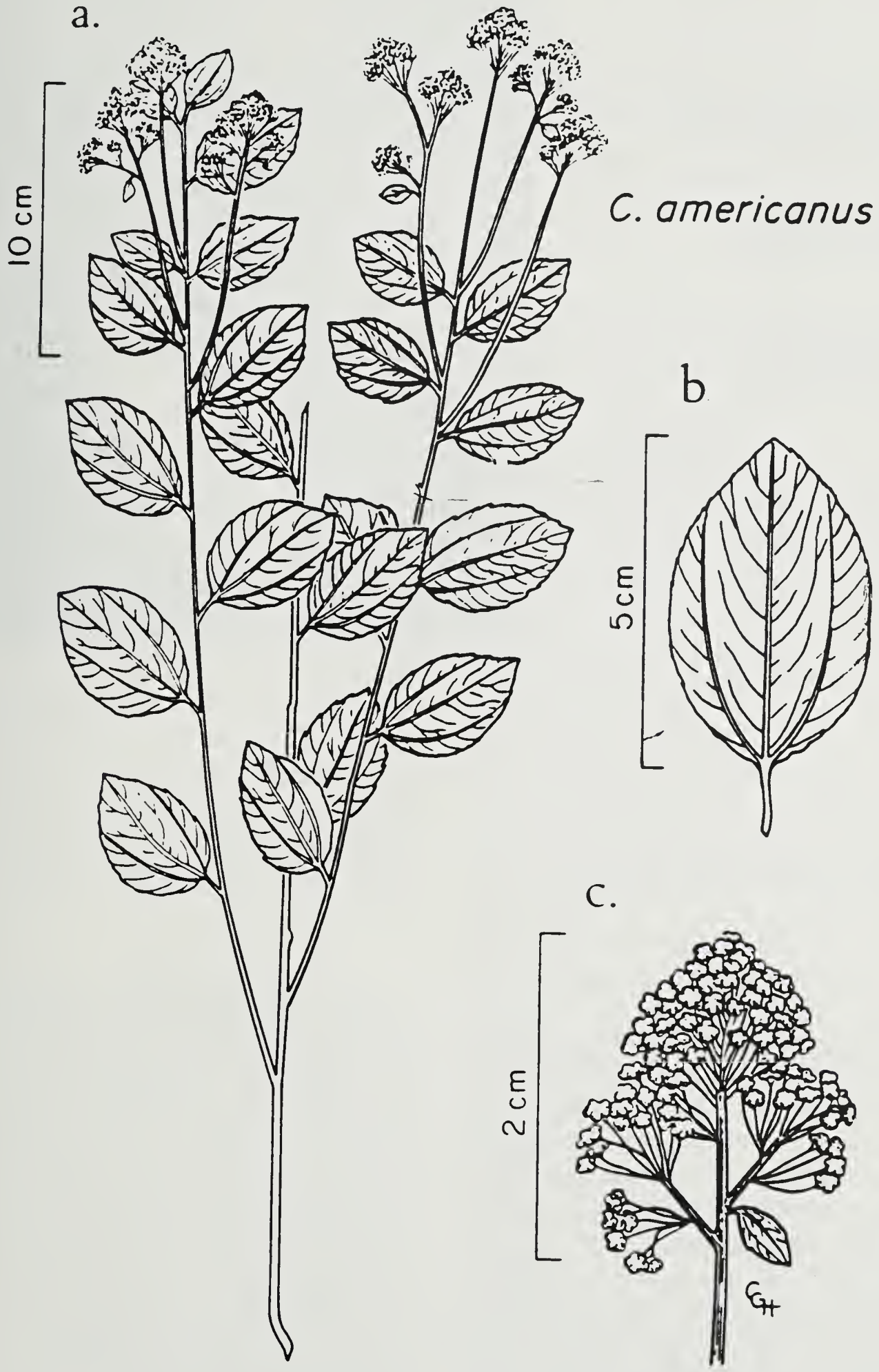
Ceanothus americanus was used during the Revolutionary was as a substitute for oriental tea and was called "Jersey tea" (later to become "New Jersey tea"). The leaves provide a tasty tea, but the drink lacks caffeine.

The leaves of New Jersey tea are prized by people who use natural pigments, because they provide a brown dye for fabrics. Mordants, which fix the color, are not required for this dye. This is a very unusual trait.

Numerous medicinal properties have been ascribed to New Jersey tea. It was used by the Amerindians and called "Eliskalu" by the Cherokees. Appalachian settlers used it as an astringent, stimulant, antispasmodic, expectorant and sedative. In the 1800's, it was considered to be an excellent antisyphilitic and antiscrofulous agent.

The next time you walk past a shrub with remains of last year's fruits as clusters of tiny, empty discs, or with clusters of tiny, white flowers or 3-lobed fruits, stop and look more intently. If the leaves have three strong veins arising from the veins of the leaf (see Figure 2b), you may have encountered a *Ceanothus* plant.

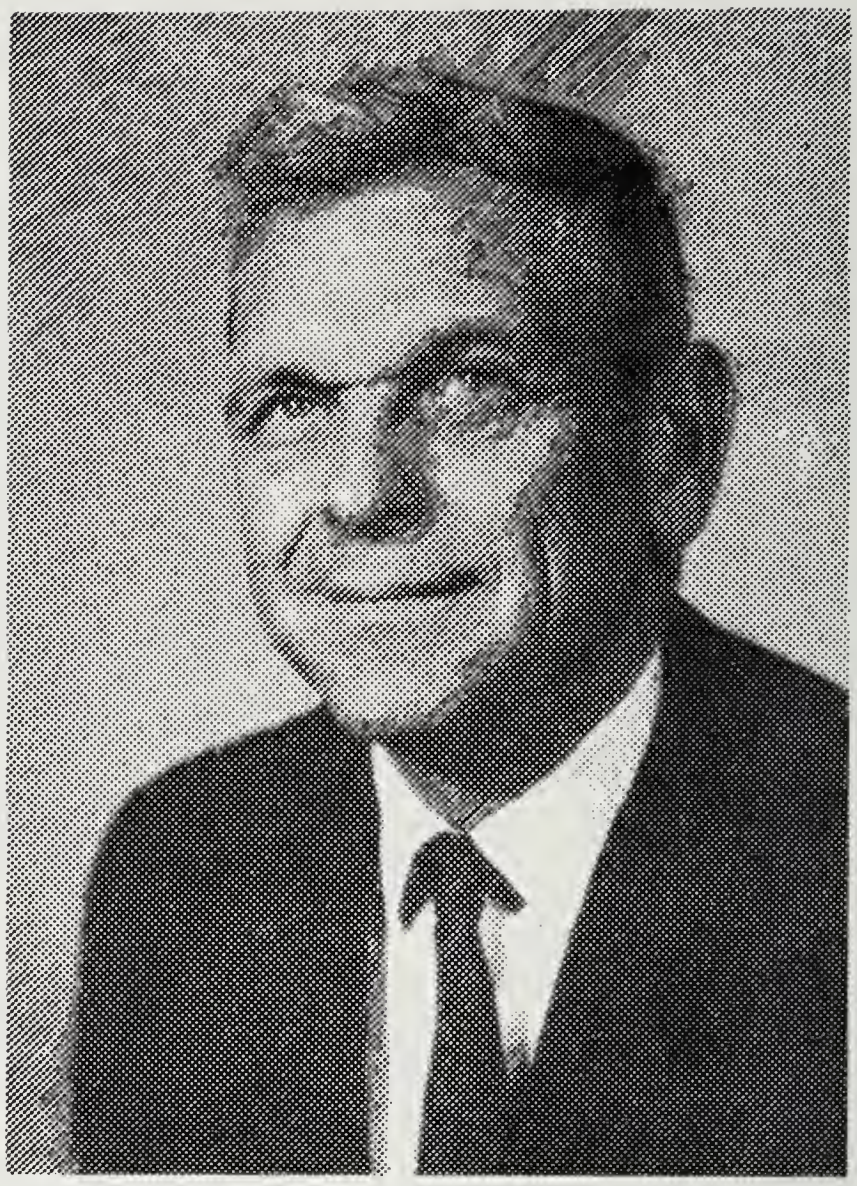
Fig. 2



Illustrated by
Carol L. Gubbins Hahn

Leonard Ensign Foote

November 2, 1918 - May 9, 1989



By Donald W. Pfitzer

LEN FOOTE walked into my office on a cold January day in 1957. We had talked photography and especially photographing wild flowers on a number of occasions before. This time Len had an Exakta camera, one of the early, fine single lens reflex cameras, he had just acquired. It was not a new one with all the owners manuals and instructions. He knew I had used an Exakta before and asked if I knew anything about it. From that day on Len and I talked nature photography every time he came to the U.S. Fish and Wildlife Service office in Atlanta. I was not surprised when he came in one day with a complete Hasselblad outfit.

Len was a great flower and plant photographer, but he was so much more than that. As a trained biologist with a wide background in Botany and other sciences, Len not only recorded the plants on film, he knew and recorded the natural history facts about the plant or animal. He was a modern Bartram. His interests were many, and more importantly he, like Bartram, recorded his work and findings for all to use. This, as any Georgia and Southeastern wildflower student knows, led to the publication of the most complete wildflower book for the region yet to be published: "Wildflowers of the Southeastern United States," with Wilbur Duncan. This book only included annual and perennial herbs.

Two books co-authored with Dr. Sam B. Jones have been published this year by Timber Press. The first, "Native Shrubs and Woody Vines of the Southeast," is reviewed on page 17 of this issue. The second, "Landscaping with Wildflowers," has just been released.

For the Georgia Botanical Society Leonard was a mix of pioneer, leader, hero and patron saint. For example, when the Richard B. Russell Scenic highway was being planned, it was to go through a gap that had a large stand of yellow lady slippers. Recognizing this, Len, along with GBS, prevailed on the planners and engineers to change the route of the highway so it would spare this beautiful orchid. That patch is still there today, a living memorial to his concern for protecting the North Georgia mountains. A few years ago, as a member of Georgia's Board of Natural Resources, he led a GBS tour of Pigeon and Lookout mountains to the very sensitive microhabitat called "The Pocket." He recommended to DNR Commissioner Ledbetter that The Pocket be protected by whatever means necessary. This was accomplished and The Pocket is restricted to limited use so that the uniqueness of the area is not destroyed by being loved to death by visitors.

But wild plants were not his only interest or forte. Leonard was first and foremost a distinguished wildlife biologist and manager. He received his B.S. Degree in Forestry and Wildlife Management in 1940 from the University of Connecticut and an M.S. Degree in Ecology from the University of New Hampshire in 1942. He even took post graduate work in Oceanography at Yale University.

After working with both the New Hampshire and Vermont Game and Fish departments and being Research Leader with the Illinois Natural History Survey, Len became the first Southeastern Field Representative for the Wildlife Management Institute in 1947. This is a national private organization dedicated to wildlife restoration. The Institute works closely with federal, state and private agencies and individuals; sponsors the annual North American Wildlife and Natural Resources Conference; contributes funds for research and graduate training in wildlife management at 20 land grant colleges; publishes a bimonthly Outdoor News Bulletin and a series of professional books on wildlife and its management.

Leonard was the founder of the professional Southeastern Section of the Wildlife Society and was its president in 1949-50. He was the prime mover and promoter of cooperative wildlife research and management projects, such as the Cooperative Dove Study, the Cooperative Statistics Project at North Carolina State University, and the Southeastern Cooperative Wildlife Disease Study headquartered at the University of Georgia's College of Veterinary Medicine. The latter project is financed by 14 southeastern state game and fish agencies and a $200,000 annual federal appropriation. It has an international reputation in wildlife diseases and their relation to domestic stock and humans. Since the program was initiated in 1955, Leonard served on its Steering Committee which is made up of the President of the University of Georgia and representatives of federal and state wildlife agencies. Leonard received the American Motors Professional Award in 1962 for his promotion of these cooperative programs.

Since 1947 the Wildlife Management Institute has examined the basic laws, organization and programs for 37 state and provincial game, fish and natural resource agencies at the request of the governors, ministers, or legislature. Leonard assisted in these investigations in Florida, Louisiana, Tennessee, Kentucky, South Dakota and South Carolina. In the latter state he served as a consultant to Governor Strom Thurmond and

the newly formed Wildlife Resources Commission during then Governor Thurmond's first year of office. He retired from the Wildlife Management Institute in 1977.

Foote initiated and served on the National Shore and Upland Migratory Bird Committee and helped secure federal funding for accelerated research on the lesser migratory game birds. He developed the national mourning dove censusing system now employed annually on 800 call count routes by state, federal and privately employed individuals to appraise the status of this most important game bird. Results from this inventory are annually used as a basis for setting hunting regulations. For his work in these cooperative programs Leonard received Georgia Wildlife Federation's "Wildlife Conservationist" of the year award in 1967 and the National Wildlife Federation's similar award the same year.

If this were not enough Leonard was a very active member of the Fontana Conservation Roundup that met each year in Fontana Village to discuss and find solutions to many conservation issues nationally and worldwide. He served on many committees of the Southeastern Association of Game and Fish Commissioners, receiving their highest award for outstanding contributions to natural resource management, the "C. W. Watson Award."

Leonard received Georgia Department of Natural Resources' highest award, the "1988 Rock Howard Award." He was commended for his 14 years of service on the Board of Natural Resources and for four years on the Game and Fish Commission. During these years he was a strong proponent of hiring fully qualified professionals for the Department of Natural Resources and for the Game and Fish Division. He also advocated the development of research programs to solve resource problems, to provide adequate access to the outdoor recreational opportunities of the state, to support the nongame program, and to protect sensitive areas and endangered species.

Leonard was considered to be one of the most effective members of the Board of Natural Resources and its Fish and Game Division. This was in part because of his extensive biological background, but more than that he was wise about human nature. He was noted for quickly getting to the bottom of any issue, and he weighed the pros and cons carefully before he voted. As a Commissioner for Game and Fish and as a member of the Natural Resources Board, he was greatly respected by his peers. It was said of him, "When Len Foote spoke we listened." He always voted with the long range impact of an issue in mind rather than an expedient way out.

Leonard and Grace his wife of 48 years lived in a house they built themselves in a lovely wooded area that is filled with the wildflowers they both enjoyed. He had strong interests in many things, was a skilled woodworker, gardener and photographer, and enjoyed computer recreation.

At the time of his death, he was mapping the sedimentary rock structure in Northwest Georgia, a job he considered good winter exercise. His work will contribute greatly to our geological knowledge of the state.

The Board of Natural Resources at its May Board meeting established the Foote Nongame Wildlife Project in his honor. In so doing they said his "lifetime contributions to the enhancement and protection of the natural and environmental resources of the Southeast and particularly Georgia will benefit citizens of this state through many future generations." The Board continued, "In recognition of Leonard Foote's work and his numerous interests, the Board encourages his many friends to contribute to the fund being established in his honor. At a later date the Board will select an appropriate project for the use of the funds contributed and all participants will be so advised." Anyone wishing to contribute to this fund can send a check to: Foote Nongame Wildlife

Project, Georgia Department of Natural Resources, 205 Butler Street, Suite 1252, Atlanta, GA 30334. In addition the Board of Natural Resources directed the Commissioner and staff to identify appropriate properties managed by the Department, such as wildlife management areas, for their consideration from which to select one to be named in Len's honor. This will be done in the near future.

The recently produced DNR movie, "Give Wildlife a Chance," has been dedicated to Leonard. He helped with some of the location photography for rare and endangered plants. The movie is designed to inform people about the state's Non-Game programs.

Leonard was a very productive writer. His three co-authored books mentioned above and the Duncans' "Trees of the Southeastern United States" would give anyone with a keen interest in plants a very complete library on plant identification of Georgia and surrounding states. He also authored many scientific papers on doves, other wildlife, fish and forestry management. His popular writings were extensive. Over 50 appeared in The *Atlanta Journal-Constitution Magazine, Florida Wildlife, National Wildlife, Outdoor World, Pennsylvania Game News* and other media. Foote was hailed as an excellent nature photographer, producing 57 covers of the *Atlanta Journal-Constitution Magazine.* Several hundred of his photographs have been published in these and other publications, including the Bronx Botanical Garden's "Wild Flowers of America" series.

Foote was affiliated with many private conservation organizations in Georgia, and was an honorary member of the Georgia Conservancy and a member of the Executive Committee of SAVE.

Leonard E. Foote died May 9, 1989 of a heart attack. He was 70. His work and influence in Georgia and the Southeast will be used and remembered for many, many years to come. I am very honored to be listed among his many friends.

Book Report

Native Shrubs and Woody Vines of the Southeast: Landscaping Uses and Identification, by Leonard E. Foote and Samuel B. Jones, Jr., Timber Press, Portland, Oregon, 1989. 199 pages, 220 color photographs, 8 line drawings. $32.95.

THE LATE Leonard Foote and Dr. Sam Jones have filled an important void with the first comprehensive guide to the shrubs and woody vines from east Texas and Arkansas, up the Ohio River to the Mason-Dixon Line, and all points south, except peninsular Florida. Virtually all shrubs and vines in this area are described and may be confidently identified.

Some 550 species are said to be described, but I was able to count only 496 for which 202 have a photograph. Since the definition of what constitutes a shrub was up to each author, there is nothing magic about the number, and since some taxonomic treatments are always in question, actual counts have little real meaning. What general treatment Mr. Foote and Dr. Jones used is not given; the families and species are not consistent with "The Distribution of the Vascular Flora of Georgia." So it must be assumed that the treatment used was their own interpretation.

Several ways to identify a plant are suggested. The first is to use the index to either scientific or common names. If you know this much already, identification will be a snap! Next comes the most widely used method: Thumb through the color pictures. Since fewer than half the species have a photograph, the limitation of this method should be immediately obvious. The reader is warned by the authors not to use this for a final determination but to go to the text for further information.

The best way to identify a plant is to use the keys at the back of the book. First consult "Key to Families of Shrubs" or "Key to Families of Woody Vines." These will take you most of the time to a genus level ranking and in many cases to the species. If the genus has more than three species, there is a key for them, and 49 are provided. Some are particularly helpful for difficult genera like hawthorns *(Crataegus)* with 16 species here, blackberries *(Rubus)* with 14 and blueberries *(Vaccinium)* with 13. It is now immediately apparent that Foote and Jones can be called "lumpers" at least with regard to these miserable genera.

(Continued)

(Continued from page 17)

Book Report

Using the pictures after the keys makes good sense. Learn to use the keys and the vocabulary they force upon you. A good glossary is included, and the line drawings are very helpful, especially for types of inflorescences and hairs. They call the keys simple, but for most readers they will be a little intimidating. The glossary will be used nearly every time the keys are used! Using them will make you *much* better at identifying plants.

A feature unique to this book is the emphasis on landscape uses for our native flora. Many species are identified for use in the garden with specific information as to how they can best be used. The problem of getting good plants and not destroying sensitive ones has been addressed (in fact, Sam Jones operates a nursery!), and it tells how to use and plant them in your garden. The publishers consider this the main thrust of the book. It should spur on the use of natives in gardening.

Recognizing that the book is a "first" (and I would be hard pressed to do better), there are still some nits to pick about it. The photographs are interspersed throughout the text as in the old Peterson guides, and thus they are difficult to find. I prefer for the text and pictures to be on the same page. If not, I prefer for the pictures to be together in the same section. Only scientific names are given for the pictures, and no page number references to the text. The emphasis on common names in the text is abandoned where it is perhaps most needed! The pictures are quite good, but the choice of emphasis is not clear other than some very good photographs get the larger space. They tried to have key diagnostic features in the picture, but this is not always the case, and some are prettier than useful. One is a misidentification, as *Illicium parviflorum* has yellow petals, yet the photograph shows beautiful white petals. It is probably an oriental cultivar or the white-flowered Florida form. "Beauty-berry" is pictured upside down. No size references are given for the photographs, which can lead to confusion.

This book belongs in any serious plant-lover's library and will be constantly used as a quantum leap forward. For us Georgians, having the entire state covered from Rabun Gap to Lake Seminole is a real plus—nothing else quite does the job!—*L. Scott Ranger*

Site-Seeing

A Wildflower Oasis in the City

By John Gorecki

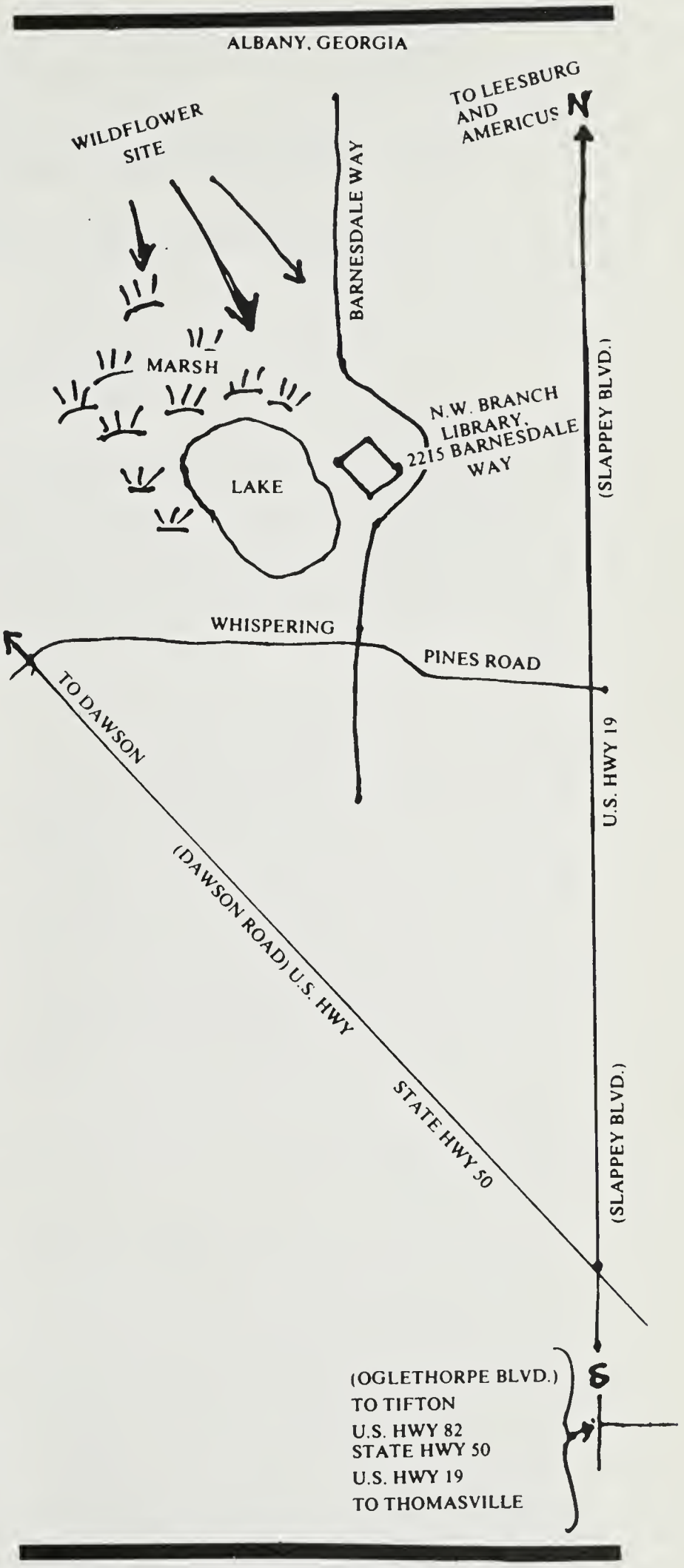
ONE OF THE BEST kept botanical secrets in Albany, Georgia, is the disturbed area adjacent to the Northwest Branch of the Dougherty County Public Library. This low, lightly wooded, irregular tract of ground is bounded by a marsh and small lake, beyond which lies residential and commercial Albany. You may not find rare and endangered species here, but if you can savor the beauty of the more common wildflowers, you will find—*multum in parvo*—a great variety and abundance compressed in a space some 50 by 60 yards in extent. It is easily reached from many directions, as it lies in one of the major residential areas in northwest Albany.

In March and April, *Viola papilionacea* in the thousands carpets the lower stretches. Against the purple background the bright yellow blossoms of mock strawberry *(Duchesnea indica)* provide a striking contrast. Most flowers here are not showy like these but disclose their unique beauty only from closer range. A good example is the colony established by the skullcap, *Scutellaria racemosa,* introduced from South America into the Florida Panhandle and spreading into our region. Under a magnifier it yields up the splendor of its pale purple corolla, only 3 mm long, with dark violet markings on its even paler lower lip. Nearby one may find the orange-red corollas of creeping mallow *(Modiola caroliniana),* the white flowers and strangely swollen nodes of *Eclipta alba,* the soft yellow flowers of *Senecio glabellus,* and the pale lavender blossoms of Japanese artichoke *(Stachys floridana).* Here too in the early spring are the delicate cream-colored flowers of the blue-eyed grass, *Sisyrinchium rosulatum,* with the purple "eyes." Similar in appearance from a distance, false-garlic *(Allium bivalve)* sprinkles the ground, while throughout floats the blue campanulate *Wahlenbergia.*

Although not as showy as the violet, several other species on this low, often damp soil form dense ground covers. Spotted medicago *(Medicago arabica),* wild chervil *(Chaerophyllum tainturieri),* starwort or giant chickweed *(Stellaria pubera),* low hop clover *(Trifolium dubium),* pony foot *(Dichondra carolinensis),* and Carolina cranesbill *(Geranium carolinianum)* come into their own. Among the mat-forming plants are spring cleavers *(Galium aparine)* with its sprawled, scabrous stems and, later in the summer, the dayflower *Commelina diffusa* with its three tiny blue petals.

In the late summer and fall, those who like to study the ecology of different species of the same genus may find two versions of three-seeded mercury, *Acalypha gracilens* and *Acalypha rhomboidea,* growing in widely separated habitats. *Ludwigia decurrens* (primrose-willow) and the distinctively different *Ludwigia leptocarpa,* found close together, may be easily compared. Here I should mention that both pond cypress *(Taxodium ascendens)* and bald cypress *(Taxodium distichum)* grow about the lake, and one may assess their differences quite easily also. Other plants of this season include various species of *Polygonum,* the deep blue *Jacquemontia tamnifolia,* ground cherry *(Physalis angulata)* with its bluish anthers set against yellow petals, the yellow bur marigold *(Bidens frondosa),* and the purple heads of mistflower *(Eupatorium coelestinum).* Late in the season, from mud-banks covered with clumps of spikerush *(Eleocharis),* the malodorous marsh fleabane *(Pluchea camphorata)* reminds us that all this riot of living forms is about to cease until the next spring. What new groupings or even new species will appear then?

What is common we take for granted; what is strange and rare we extol. Were ground cherry or Japanese artichoke or blue-eyed grass a rarity, it would be sought after as a botanical treasure. Yet each one of these common species, on account of its own intricate structure and beauty, is worthy of our admiration and appreciative awareness.



A FEW GUIDES TO SOUTHWEST GEORGIA PLANTS

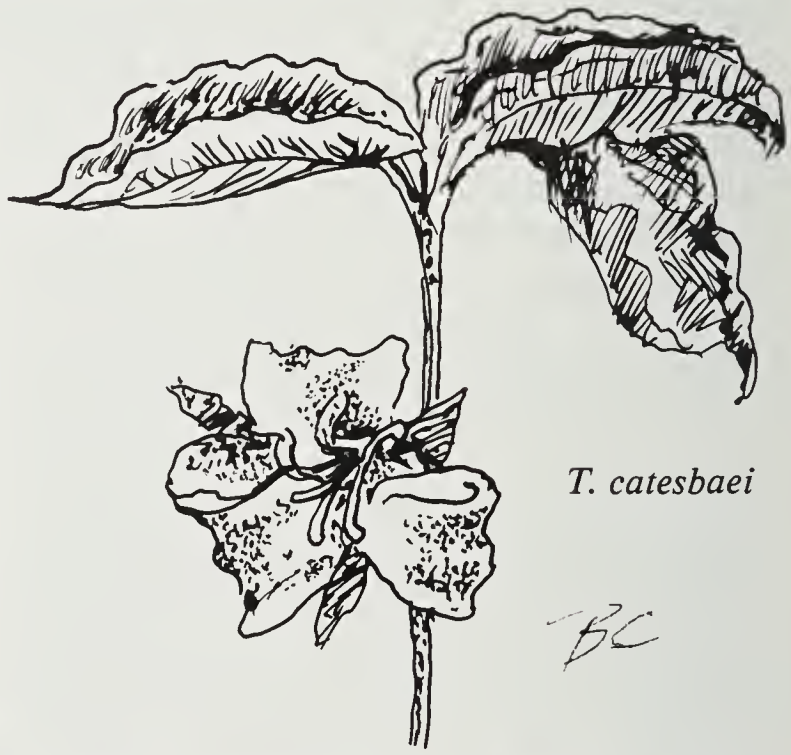
In addition to the "Manual of the Vascular Flora of the Carolinas," by Radford, Ahles, and Bell (Chapel Hill, 1968), I have found especially useful the recent "Guide to the Vascular Plants of the Florida Panhandle," by Andre Clewell (Tallahassee, 1985), and Arthur Cronquist's "Vascular Flora of the Southeastern United States, Volume 1: Asteraceae" (Chapel Hill, 1980).

Those "Funny" Trilliums on Rabun Bald

A meditation on trilliums and species

By John Garst

Dedicated to the memory of Alma Toevs Walker, Georgia Botanical Society member, who died October 20, 1989. Alma was a leader and tireless worker in efforts to preserve that which is environmentally and historically significant, and a good friend.



T. catesbaei

WE KNEW it would be a good time to visit Rabun Bald. My wife Edna and I had been there before on the same day years ago — May 8th. With Marie Mellinger and our neighbor Vicki Dickens, we were celebrating Mother's Day 1988 and my birthday, but mostly we were scouting the peculiar trilliums that Marie had told us about. Our resident trillium expert, Tom Patrick, got caught with a conflicting engagement, so we're still waiting for a professional opinion of those funny trilliums.

Rabun Bald, the second highest peak in Georgia, is just south of the Georgia-North Carolina border near the northeastern corner of Georgia. From Clayton, Mountain City or Dillard, Georgia, you start toward Highlands, North Carolina, but at Scaly, North Carolina, you turn south and head back into Georgia, mostly following a ridge with houses and farms along it.

At one right turn, you swing around a house with a flat, soggy area behind it. It is a bog that once held some glories for Georgia, such as the very rare swamp pink *(Helonias bullata)* and the purple pitcher plant *(Sarracenia purpurea)*. Alas, the bog has been abused. I'm not certain of its present condition, but several years ago the once-numerous pitcher plants could be counted on the fingers. I don't know about the swamp pinks, which never were numerous.

We passed the bog without stopping and drove on to the base of the knob, the "bald" of Rabun Bald. Some new houses had been built since I was last there. Every house cuts away some of the rich wildflower sites. National Forest property includes the knob, apparently, but not all of the slopes up to it.

I remembered some yellow ladies' slippers *(Cypridedium calceolus)* in the woods to the right, visible from the road, so we started the hunt. We were disappointed at my spot, but Vicki found a beautiful clump farther into the woods.

The anomalous trilliums were all over, armies of them. They were white, and

they held their flowers erect. A very few had turned rose. If you keyed them out, you might not wind up at *Trillium catesbaei,* which is what I think they are.

T. catesbaei grows in the woods around many of our homes. It is the only trillium I have seen in the wild in my county — Clarke.

It has a confusing nomenclatural history that involves Athens. In 1817, Elliott described two species, *T. catesbaei* and *T. nervosum,* thinking that his *T. catesbaei* specimen was the same species as a plant illustrated in an earlier work by Mark Catesby. Later authorities identified Catesby's plant with Elliott's *T. nervosum* instead and, in an error that "stuck," transferred the name *T. catesbaei* to it. As a consequence, the name *T. catesbaei* is not available for the species to which it was assigned by Elliott. According to Fernald's article in a 1944 issue of *Rhodora, T. catesbaei* Elliott (1817) is now known as *T. rugelii* Rendle. Elliott's type specimen for *T. nervosum,* now *T. catesbaei,* is from Athens, Clarke County, Georgia, where it was collected by Mr. Green.

The *T. catesbaei* to be found around Athens has flowers that nod, falling below the leaves. Freshly opened flowers are white, but within a couple of days, they turn a beautiful rose, which may gradually deepen as the flower ages. In contrast, the trillium flowers on Rabun Bald are erect (with flowers held distinctively above the leaves) and white (turning rose in old age only, apparently).

Why, then, would I think the Rabun Bald trilliums to be *T. catesbaei*? First, I have seen other erect trilliums that knowledgeable people told me were *T. catesbaei.* They also occur in the mountains of northeastern Georgia. Second, besides flower color and inclination, the Rabun Bald plants look "right" for *T. catesbaei.* The petal shapes, wavy margins and strong recurvature are like *T. catesbaei.* The recurved sepals are like *T. catesbaei.* And, like *T. catesbaei,* the Rabun Bald plants have tortuous, bright yellow anthers. The differences could even be environmental; maybe Rabun Bald plants, moved to Athens, would nod and quickly turn rose.

What is a species anyhow? Evidently botanists can't agree, since they keep changing things, lumping and splitting, elevating varieties to species, and degrading species to varieties.

This is particularly evident in the North American members of the genus *Trillium.* Compare the treatment of *Trillium* given by Radford, Ahles and Bell, "Manual of the Vascular Flora of the Carolinas" (1968, hereinafter RAB), with that of Thomas S. Patrick, "The Trilliums of Eastern North America," a pamphlet available from Tom at the Natural Heritage Inventory, Georgia Department of Natural Resources, Route 2, Box 119-D, Social Circle, GA 30279, hereinafter TSP). His *T. vaseyi* is RAB's *T. erectum* var. *vaseyi.* TSP's *T. cernuum* is not found south of northern West Virginia and Virginia, while RAB's *T. cernuum* occurs in the Carolinas, Georgia and Alabama; to TSP, the latter plants are *T. rugelii.* TSP's *T. luteum* is RAB's *T. cuneatum* var. *luteum.*

There are additional examples in these two treatments, and the history of *Trillium* taxonomy is replete with others. Fernald's 1944 *Rhodora* article on this subject provides interesting, even spicy, reading.

Some revisions represent advances in our knowledge of the observable facts. Others represent different conclusions drawn from the same facts. Clearly, the "species" concept is not precise.

Roughly speaking, a species is a kind of plant (or animal) which reproduces its own kind. This "biological" or "isolation" concept of species is somewhat different from other recent proposals. One to which it is closely allied is the "recognition concept," in which a species is a group of individuals with the same specific mate recognition system.

The species concept has real trouble with variation and evolution. If species always breed true, how does a new species

arise? In 1858, Charles Darwin and Alfred Russel Wallace started us on the right trail by describing a theory of evolution through natural variation and survival of the fittest. The key is variation. Without it, there is no evolution. With it, the species concept is muddled.

Understanding evolution and its observable consequences is a problem that science seems to be getting into in depth just now. A number of questions are being debated. Does speciation, the development of new species, involve slow and gradual change (as Darwin thought) or relatively sudden change (as some now contend)? Do related species originate everywhere in their range, or do successive ones arise at a center of origin — an area of active evolution, from which they disperse outward in waves? If there is a center of origin, where are the most advanced and most primitive members found — at the center of origin, at the periphery of the distribution of related species, or not necessarily either? Does all speciation begin with the physical division of a continuous population? Most of the conceivable answers to these questions have their advocates.

When hybridization, natural variation, and evolution are included, it becomes difficult to maintain a clear concept of "species." It is a useful organizing principle, but like many other theoretical concepts, it is not always clearly applicable to what we find in nature. Sam Jones and Arlene Luchsinger ("Plant Systematics," p. 177, 1986) put it this way:

> "Departure from typical, well-developed biological species is common among plants and should not be considered abnormal .... For this reason there is little adherence to a strict biological species concept as a definition of a species among higher plants."

As an example of variation within a species, take us humans. How can it be, with all of our racial and other variations, that we are all *Homo sapiens?* Higher primates, including humans, may have spread over the world from an evolutionary center of origin in Africa (Briggs, "Centers of Origin in Biogeography," 1984). As time passed, as conditions changed and as humans crossed deserts, mountains and seas, genetic variation continued and differentiation by natural selection occurred, resulting in the races found today. However, all of the races can and do interbreed, and few were ever totally isolated from others. Even within a race, there is considerable variation among individuals. The evident differences between humans of any race and other great apes (gorillas, chimpanzees, orangutans) are much more distinct than the differences among the races. And we do indeed share a common specific mate recognition system. We find human mates, often of different races, and we do not mate with gorillas, chimpanzees or orangutans. Therefore, humans are assigned to a single species that shows considerable variation.

A similar description may apply to *T. rugelii* in Stephens County, Georgia. Going upstream along the south and west side of the Tugalo River from a point a couple of miles downstream of the mouth of Panther Creek, then continuing up that creek, there are many successive stations of white-flowered trilliums. Along the Tugalo, and at first along Panther Creek, they all nod and have red-to-purple anthers and ovaries. Farther upstream, some have erect flowers and white anthers or ovaries. Then, at two ravines that are cut into a marble substrate, all of the flowers are erect, and many have white anthers and ovaries. Rarely, the petals are red or maroon. Continuing up Panther Creek, the trilliums once again begin to nod and have fewer white flower parts. Anywhere along Panther Creek, every flower that is white is also erect.

To Tom Patrick, these plants are all *T. rugelii* (personal communication). The species is varied, with several "races." Although others have referred the erect-flowers plants on Panther Creek to *T. erectum* and the nodding ones to *T. cernuum,* Tom finds characters that preclude

these assignments. He has seen other stations of erect-flowered *T. rugelii* in the mountains of North Carolina. He does not consider the inclination of the flower (erect or nodding) to be a reliable species-differentiating character.

Although no studies to determine reproductive isolation or specific mate recognition system have been done, the presence of populations containing intermediate or mixed forms, occurring between those in which all of the flowers are nodding or erect, suggests interbreeding. Among the possible interpretations are: (1) One pure species, with natural variation, is present; (2) one pure species is present, along with some hybrids with another; and (3) two pure species are present, along with hybrids between them. Tom opts for interpretation #1, a choice which concurs with the philosophy of Jones and Luchsinger (1986), who note that "if each minor variation in plant populations were to be made the basis of species distinction, there would be no end to the number of species."

This brings up the point that most botanical assignments of species are based on morphology, not on reproductive characteristics. In view of this, it might seem inconsistent to assign plants which have obvious morphological differences, invariant within populations but differing between them, to the same species.

I doubt that the erect Rabun Bald trilliums would be assigned to *T. catesbaei* if they were geographically isolated from typical *T. catesbaei.* If they were found in China, for example, instead of Georgia, I suspect that the very same plants would be considered to be *T. "sinocatesbaei"* or some such.

Trilliums are found in eastern Asia, as well as western and eastern North America. They must have had a continuous distribution at some time in the past. It may be that during a warm period, they occurred all across the northern continents, or at least across northern North America and eastern Asia. Then an ice age came, and the glaciers drove them southward, cutting the northern connection between the distributions in eastern Asia, western North America and eastern North America.

If they were ever there, trilliums became extinct in Europe. The much smaller diversity of plants in Europe than in the United States and eastern Asia is thought to be due to the east-west orientations of the mountain ridges in Europe and the north-south orientations of those in North America and eastern Asia. East-west mountains are formidable barriers to plants trying to get out of the cold. They probably have nightmares in which an ice age comes and they run south, reach the lower mountain slopes, can't climb higher, and are doomed by an advancing glacier and a cooling climate.

Where trilliums survive today, the mountain ranges are north-south. Plants escaped from glaciers and cooling climates by moving south in lowlands and valleys. As the climate warmed after an ice age, they spread northward again from their refuges, but the distributions in eastern Asia and in western and eastern North America have not re-established contact. They have diverged genetically — no particular species is found in more than one of these three areas.

Artist's concept of
an erect *T. catesbaei*

If the Rabun Bald plants were on some mountain in China, they would be seen to be definitely isolated from the *T. catesbaei*

population of the southeastern United States, and they would be seen to differ consistently from *T. catesbaei* in morphology, so they would be considered to be a different species. Somehow, this disturbs me. It seems evident that the Rabun Bald trilliums don't interbreed with typical *T. catesbaei.* Otherwise, they wouldn't be so uniformly white and erect. I doubt that there is a set of plant communities reaching down from Rabun Bald, where one extreme form occurs, to Athens, where typical *T. catesbaei* is found, having intermediate and mixed populations between. My suspicion is that the plants on Rabun Bald are as isolated from typical *T. catesbaei* as they would be if they were in China.

No one has ever seen a species. They have seen individual organisms and populations, but not species. A species is a definition, a creature of the mind, an organizing principle that can be imposed on nature. Sometimes organisms conform to a simple species concept, sometimes they don't.

The plants on Rabun Bald are *T. catesbaei* if they fit the *T. catesbaei* definition. Morphologically, they are close to typical *T. catesbaei.* A morphological definition could include them. However, they may differ in unseen ways. Their chemistry may be adapted to their habitat. Tom Patrick, give us a helping hand!

As we sat on logs and rocks on Rabun Bald, having a lunch of fine wine and deliciously filled croissants, and celebrating the beauty of the scene and life in general, I wasn't thinking theoretical biology. I was taken at the moment by the splendor and variety of nature. With its rich diversity of plants, Rabun Bald is one of our treasures. Enjoy!

First Person Singular

Competition on a Pristine Lake

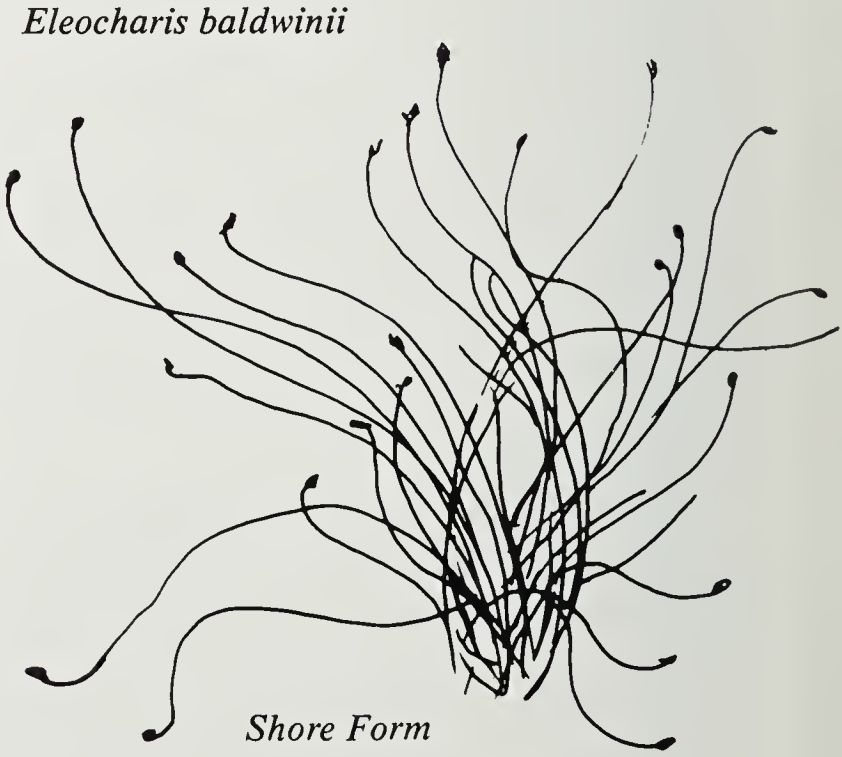
By Helen D. Brown

MY FIRST serious involvement with plants began in 1968 when I started studying a small lake in northern Florida on University of Florida property. At first, my research was to involve only the microscopic algae of the lake, but the eight species of aquatic plants in the lake soon captured my attention. I was to follow the ups and downs of these eight, and others which appeared, for the next twelve years.

The original eight aquatics included a small bladderwort, *Utricularia,* which drifted in the lake's surface waters; a species of *Sphagnum,* the bog moss, growing in the shallow areas near shore; a small plant named *Mayaca aubletii,* which also grew submerged near shore; the sturdy *Panicum hemitomon* or panic grass; and the bluish grass, *Leersia oryzoides.* Masses of the two grasses, *Panicum hemitomon* and *Leersia oryzoides,* intermingled and formed a ring of green around the shoreline.

My favorite among the eight aquatics, however, was not any of the above but was the

Eleocharis baldwinii



Shore Form

New York Botanical Garden Library
3 5185 00269 3826

small sedge, *Eleocharis baldwinii,* which grew everywhere in the lake in a variety of forms, although unobtrusively. It grew rooted in the bottom of the lake with its fine filamentous body waving in the currents. It floated in masses, which had been dislodged from the bottom, but which thrived nevertheless. Finally, it grew on land as small sprigs, left high and dry by a falling water level—grew and produced seed heads.

All these aquatics and others grew in an uncrowded manner in the small lake. None was very abundant, but had a foothold and was part of the ecosystem.

Unfortunately, in 1969 fifty or so mallard ducks joined the other life in the lake. Another researcher gained approval to use the lake as his study site of the nesting habits of the mallards. At first the ducks were placed in a pen at one end of the pristine lake. Then after a year or so, they were released to roam upon the lake. Never again were the lake and its plant population the same.

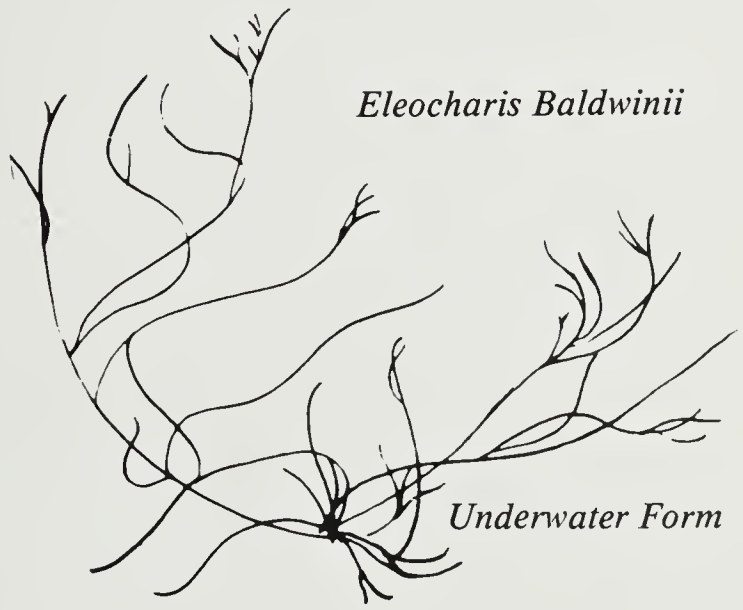
While a few ducks on a lake make for a pastoral scene, fifty ducks soon overwhelmed this small lake of less than an acre. The lake's shoreline soon appeared to have been trampled by a herd of elephants. Also, duck food and duck feces decomposed in its water, adding greatly to the level of nutrients or fertilizers being added to the lake.

While the addition of fertilizer to soil on land is usually viewed as desirable, the addition of fertilizer to a pristine lake is most certainly not desirable and can be disastrous. The miner's canary in this case seemed to be the eight aquatics. Six of the eight promptly disappeared. Only *Panicum hemitomon* and *Eleocharis baldwinii* remained. *P. hemitomon* had actually increased greatly, taking over and adding to the space around the shoreline where the *Leersia* had formerly grown. *Eleocharis baldwinii* was struggling but remained throughout the twelve-year observation period. During the time when the ducks controlled the lake habitat, its *E. baldwinii* population declined. Those sparse specimens which remained were mainly submerged. Only a few floating plants appeared from time to time.

In 1969 I moved to Georgia to work. Although I journeyed to the lake as frequently as possible, I no longer had the pleasure of visiting it weekly. The lake, however, continued its rapid decline. Now, when the water level in the lake rose, small pools of smelly blue-green algae appeared around the shoreline between and intermixed with the panic grass. The aesthetic value of the lake decreased, and it became less and less desirable as a site for group picnics.

Then, suddenly, other people also became concerned. A committee of university professors from a number of disciplines met at the lake and decided to undertake productivity studies designed to show technically whether or not the lake was indeed declining. Certainly, I was not surprised when these studies showed that the lake's waters were much more fertile than they had been before the appearance of the mallards—a fact the disappearance of the aquatics had indicated. The department which controlled the lake decided that the ducks must go. The only question which remained was: Would the lake recover?

Luckily this small lake had both an inflow and and outflow stream. Although both functioned only during periods of high water after much rainfall, the high nutrient levels of the lake water were slowly flushed and replaced by water with a considerably lower level of nutrients.



When I last visited the lake in the spring of 1980, most of the eight original species of aquatics had reappeared, indicating a partial recovery of the lake. *Leersia oryzoides* again appeared as a shoreline grass with *Sphagnum* once more in shallow areas near shore. *Eleocharis baldwinii* was present in three forms, as in 1968. Only *Mayaca aubletii* and *Potamogeton natans,* a pondweed, had not returned.

However, there was an addition, perhaps replacing these losses on the one time pristine lake. Where the duck pen had once stood was a group of water lilies, *Nymphaea odorata.*

The *Hypericum* Bog

A Mini-habitat

By Marie Mellinger

ROLAND M. HARPER was the first to notice the small, man-made ponds and to give them the name "*Hypericum* bogs." Roland did most of his travelling by train, and these ponds were often adjuncts to the railroad tracks. The bog was an artificially created pond, made where dirt was dug out for railroad or highway construction. They were called variously a barrow pit (in the old days dirt was moved with a wheelbarrow), or a borrow pit, because the dirt was borrowed from one place for some place else.

The most showy plant in the bogs was St. John's-wort, *Hypericum fasciculatum.* In 1938 William A. Knight describes such a bog as "a small area of perhaps half an acre, that is covered up with a growth of *Hypericum fasciculatum.* Here the water table is practically at the ground level; at no time in the past three or four years has the author ever seen this area without some water showing at the surface."

The *Hypericum* bog is what Dr. Robert Platt classifies as an "oddball ecosystem, a stage in bog successions when the shrub *Hypericum fasciculatum* prevails."

This shrub has wiry stems, enlarged below the water level. The ponds have a hard bottom, and the erect shrubs look like groves of miniature African "witch" trees (possibly the acacia). This tree-like form indicates that the bog has a hard bottom. Leaves are evergreen. Bright yellow flowers appear at intervals during the summer. Folk lore tells us that all species of St. John's-wort have long had an affiliation with witches and were used in special rites on midsummer eve.

Hypericum fasciculatum, like any good witch, has its own "familiar," the gray hairstreak butterfly, *Strymon melinus,* whose naked, unmarked, small-headed larvae feed on *Hypericum leaves.*

H. fasciculatum shares its bog environment with other *Hypericums* and *Ascyrums* such as the evergreen *H. myrtifolium,* the coppery St. John's-wort *(H. denticulatum),* and *H. aspalathoides* with bright, golden flowers that almost hurt the eyes.

Other common bog plants are the flat-top goldenrod *Euthamia microcephala* and swamp *Pluchea.* In fall the fruits of *Pluchea foetida* look like the cottongrass of the northern bogs. Bog grasses include *Aristida paludosus* and wetland species of *Andropogon.*

When in the costal plain area of Georgia watch for these bog communities with the "feet" of the *Hypericum* rooted in standing water to know the enjoyment of identifying a *Hypericum* bog.

Fielding Your Questions

Question: How many Georgia plants are listed federally under provisions of the Endangered Species Act as either endangered or threatened?

Answer: There are currently 16 plants federally listed in Georgia. Only Hawaii, California, New Mexico, Texas and Florida have larger lists. Listing activities are ongoing; new plants have been added irregularly ever since 1978, the year in which both persistent trillium *(Trillium persistens)* and hairy rattleweed *(Baptisia arachnifera)* were added as Georgia's first federally endangered species. Candidates from Georgia, those plants officially proposed by the U.S. Fish and Wildlife Service as endangered or threatened probably will be listed shortly and include: Virginia spirea *(Spiraea virginiana),* false poison sumac *(Rhus michauxii),* and phyllodial-leaf arrowhead *(Sagittaria secundifolia).—T. S. Patrick*